



Electric Traction Department Power Director Operating Guidelines



Wilmington Office



ELECTRIC TRACTION POWER DIRECTORS OVERVIEW

The Power Director manages the power distribution on the Northeast Corridor between New Rochelle, NY and Washington, DC; Philadelphia to Harrisburg, PA as well as New Haven, CT to Boston, MA. They supervise the operations and sectionalizing of the Electric Traction power distribution, signal power and 3rd rail systems within their assigned territory. They perform a critical role in the Electric Traction Department for Amtrak.

There are currently three Amtrak Power Director Offices. They are located in Wilmington, DE; New York, NY; and Boston, MA. The three Power Director Offices oversee approximately 1,532 miles of catenary, 951 miles of transmission lines, 47 step-down substations, 9 switching stations and 20 paralleling stations. There are also connecting substations such as Septa's Sub 30TH Street, Sub 07 Allen Lane, Sub 01 Morton, Sub 02 Lenni and New Jersey Transit's (NJT) Morrisville Yard and Sub 48 South Amboy.

The Power Director Offices are 24-hour 7 days a week operation. The Wilmington Office is staffed by four Power Directors per shift, who are responsible for approximately 252 miles of electrified territory. The New York Office is staffed by two Power Directors per shift, who are responsible for approximately 95 miles of electrified territory. The Boston Office is also staffed by two Power Directors who are responsible for approximately 156 miles of electrified territory.

A typical 8-hour workday in the Wilmington, New York and Boston Power Director Offices would begin with a Shift Turnover. A Shift Turnover is a transfer of responsibility and information regarding the status of the system from the outgoing to incoming Power Director.

Information on the Shift Turnover would include any event in progress, outstanding clearances, DC power or work permits, equipment removed from or returned to service, changes in system configuration, scheduled work for the next tour of duty, personnel on property, signal power system set-up and any unusual conditions including impending inclement weather.

A Shift Turnover occurs when the relief for the next shift is physically present and ready to assume the duties of the Power Director. After a Shift Turnover has been completed, the Power Director on duty will:

- **Conduct** themselves in a professional manner.
- **Review** territory.
- **Utilize** proper telephone and radio communication techniques.
- **Reviews** and **maintains** the Logbook, Clearance and DC Power Permit forms, Shift Turnover report, Outage Scheduler, Track Usage sheet and the Out of Service Equipment Log from the date last worked.
- **Acknowledge** and determine validity of any alarms received.
- Continuously **monitor** the system to determine unusual conditions and report that information to the Load Dispatcher.



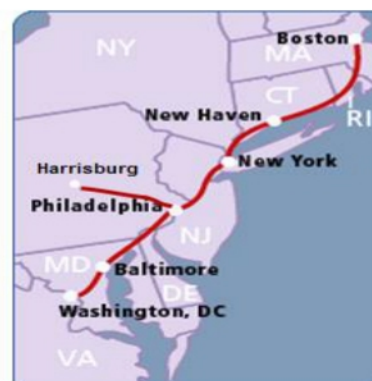
- **Monitor** radio transmissions.
- **Issue** clearances, DC power and work permits for the protection of Amtrak employees and other personnel.
- **Handle** request for planned outages.
- **Coordinate** Electric Traction functions and outages within, and other departments as required such as the Load Dispatcher, other Power Directors, Utility Companies, Trouble Desk, and Train Dispatchers.
- Directly **supervise** and (in coordination with the Load Dispatcher when required) the safety of operation, resources, and the configuration and switching of the transmission, substation, trolley, signal and third rail electrification system components.
- **Respond** appropriately to abnormal system conditions and problems, to minimize the impact to the electrification system and train operations.
- **Coordinate** with Electric Traction management, supervision, and field personnel in response to system outages. During off-hours, proper callouts must be initiated to affect the response.
- **Identify, report, and document** all unusual events.
- **Disseminate** information throughout the system as required. (Personnel whose area of responsibility is directly affected by an outage or incident).
- **Follow** up on all incidents in a timely fashion.
- **Prepare** proper Shift Turnover for the incoming Power Director.

SECTION 1 CORPORATE STRUCTURE

1.1 AMTRAK'S NETWORK

Amtrak, created in 1971, is the nation's passenger rail corporation serving 46 states, the District of Columbia and three Canadian provinces. Amtrak operates more than 300 trains each day — at speeds up to 150 mph — to more than 500 destinations over approximately 21,00 route miles. Amtrak owns about 730 route miles of track primarily in the portion of the United States Northeast shown in Figure 1-1. The remainder of Amtrak's routes operate over privately owned and maintained tracks.

Northeast Corridor



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Figure 1-1. Northeast Corridor

Amtrak is a vital part of an interconnected national transportation network, providing important transportation, environmental, and economic benefits. There are many reasons why Amtrak provides an essential piece of this national transportation system. When Amtrak was established by Congress in 1971, the mandate of the National Railroad Passenger Corporation was to provide modern, cost-efficient, and energy-efficient intercity rail passenger transportation between crowded urban areas and in other areas of the United States. Rail passenger transportation helps alleviate overcrowding of airways and highways, contributes to a harmonious interconnected transportation system, creates jobs, stimulates private economic activity, and contributes significant environmental benefits to the nation.



1.2 HISTORICAL DEVELOPMENT

- The Main Line of Public Works was a railroad and canal system across southern Pennsylvania between Philadelphia and Pittsburgh. Built between 1826 and 1834 by the Commonwealth of Pennsylvania, it included the Philadelphia and Columbia Railroad.
- Philadelphia and Columbia Railroad stretched 82 miles from Philadelphia to Columbia near the former ferry site known as Wright's Ferry, in Lancaster County.
- The Commonwealth of Pennsylvania granted a charter to the Pennsylvania Railroad (PRR) in 1846 to build a private rail line that would connect Harrisburg to Pittsburgh.
- The PRR was granted track rights over the Philadelphia and Columbia Railroad and gained control of the three short lines connecting Lancaster and Harrisburg, instituting an all-rail link between Philadelphia and Pittsburgh by 1854.
- In 1857, the PRR purchased the Main Line of Public Works from the state of Pennsylvania and abandoned most of its canals and inclined planes. Over the next 50 years, PRR would expand by gaining control of other railroads by stock purchases and 999-year leases. This line is still an important cross-state corridor, carrying Amtrak's Philadelphia to Harrisburg Main Line.
- In 1871, the PRR leased the United New Jersey Railroad and Canal Company, which included the original Camden and Amboy Railroad from Camden to South Amboy, NJ, as well as a newer line from Philadelphia to Jersey City, NJ, much closer to New York, via Trenton, NJ. Track connections in Philadelphia were made via the PRR's Connecting Railway and the jointly owned Junction Railroad (Philadelphia).
- On July 2, 1872 the PRR's Baltimore and Potomac Railroad opened between Baltimore and Washington, D.C. This route required transfer via horse car in Baltimore to the other lines heading north from the city. On June 29, 1873, the Baltimore and Potomac Tunnel through Baltimore was completed.
- On July 24, 1873 the Union Railroad (Baltimore) line opened extending the line eastward through another tunnel to the PRR's other Baltimore line, the Philadelphia, Wilmington & Baltimore Railroad (PW&B) northeast to Delaware and Pennsylvania. This route eliminated the transfer in Baltimore. PRR officials contracted with both the Union Railroad and the Philadelphia, Wilmington, and Baltimore Railroad (PW&B) Railroad for access to this line. The PRR's New York–Washington trains began using the route the next day. This line is still in use today, carrying Amtrak's New York to Washington Main Line.
- The North River and East River Tunnels are a pair of tunnels built between 1904 and 1908 by the Pennsylvania Railroad (PRR) to allow its trains to reach Manhattan and cross the East River to Long Island City in Queens. The Hudson River was previously crossed by transfer to ferries across the river. They opened for passenger service in late 1910. Sunnyside Yard also was completed in 1910. This was the final piece of the New York to Washington Main Line into what is now Pennsylvania Station in Manhattan, New York City.
- The Hellgate Bridge construction began on March 1, 1912 and ended on September 30, 1916. Built to link New York and the Pennsylvania Railroad (PRR) with New England and the New Haven Railroad (NH). The bridge was dedicated and opened to Rail traffic on March 9, 1917, with Washington–Boston through train's first running on April 1, 1917.



- In 1968 the Penn Central Transportation Company was created through a merger between PRR and New York Central Railroads. Penn Central was required to absorb the New York, New Haven and Hartford Railroad in 1969 as a condition of the merger. The Penn Central bankruptcy in the early 1970s coincided with the creation of Amtrak.
- In 1976 a substantial portion of the former New Haven main line between New York and Boston was transferred to Amtrak and now forms a major portion of the electrified Northeast Corridor between New Haven and Boston. Metro North Railroad acquired the portion between New Rochelle and New Haven.

Pennsylvania Railroad

The Pennsylvania Railroad was founded in 1846. The PRR (referred to as "Pennsy") was headquartered in Philadelphia, PA. Over the years, it acquired, merged with, or owned part of at least 800 other rail lines and companies. At the end of 1925, it operated 10,515 miles of rail line.

The first overhead electrification was the Philadelphia terminal area, where PRR officials decided to use overhead lines to supply power to the suburban trains running out of Broad Street Station. Unlike the New York terminal system, a direct current (DC) 650-volt third rail to power PRR locomotives, overhead wires would carry 11,000V 25 Hz alternating current (AC) power: the system used for all future installations.

In 1915, electrification of the line from Philadelphia to Paoli, PA was completed. Other Philadelphia lines electrified were the Chestnut Hill Branch (1918), White Marsh (1924), West Chester, the main line to Wilmington, DE (1928) and in 1930 the Schuylkill Branch to Norristown, PA along with the rest of the main line to Trenton, NJ.

In January 1933, through main-line service between New York and Philadelphia/Wilmington and Paoli was placed in operation. The first test run of an electric train between Philadelphia and Washington occurred on January 28, 1935.

On February 1, the Congressional Limited in both directions were the first trains in regular electric operation between New York and Washington, drawn by the first of the GG1-type locomotives. All regular passenger trains between these cities were electrified by March 15.

To complete the electrification project initiated in 1928, work was started January 27, 1937, on the main line from Paoli to Harrisburg, PA.

January 15, 1938 the first passenger train, the Metropolitan, went into operation over the newly electrified line from Philadelphia to Harrisburg, PA. On February 1, 1968 the PRR merged with the New York Central. Figure 1-2 shows a PRR engine passing by Sub 35 Princeton.



Figure 1-2. PRR Engine Passing Sub 35 Princeton

Penn Central Railroad

Penn Central Railroad was created in 1968. It was a merger between the Pennsylvania (PRR) and the New York Central Railroads. The Penn Central Railroad declared bankruptcy on June 21, 1970 but continued to operate freight under bankruptcy court protection. As a result, Congress created the Consolidated Rail Corp (Conrail) on April 1, 1976. Figure 1-3 shows Penn Central Railroad engines sitting in Penn Coach Yard- Philadelphia.



Figure 1-3. Penn Central Railroad Engines Sitting in Penn Coach Yard- Philadelphia

Amtrak

Congress created the Rail Passenger Service Act in 1970. Operations began on May 1, 1971. Amtrak took ownership of the Northeast Corridor (NEC) in 1976. More than 260 million passenger trips are made on the NEC per year, of which 17.1 million annual trips are made by Amtrak passengers. The balance is made on services provided by Amtrak's eight commuter railroad partners that share the NEC. The eight commuter services that operate on the NEC are Massachusetts Bay Transportation Authority, Shore Line East, Metro-North, Long Island Railroad, New Jersey Transit, Southeastern Pennsylvania Transportation Authority, MARC and Virginia Railway Express. Approximately 750,000 trips are made on the NEC - either on Amtrak or one of the commuter railroads daily. More than 2,100 passenger trains and 60 freight trains operate on some portion of the NEC every day. Figure 1-4 shows an Amtrak ACS-64 train set.



Figure 1-4. Amtrak ACS-64 Train Set

1.3 AMTRAK MISSION

Today Amtrak is a public corporation with corporate headquarters in Washington, DC. The company's mission statement gives everyone in the organization a central focus. The mission statement states that:

Amtrak is America's passenger railroad whose mission is "delivering intercity transportation with superior safety, customer service, and financial excellence."

Collectively and individually, it is the job of everyone with a connection to Amtrak to give our customers a travel experience that exceeds their expectations, while ensuring we have a safe operation and that we are continually building the financial strength of the company. In its more than 46 years of existence, Amtrak has revived rail passenger service in the United States and made it a critical component of a balanced national transportation system.

1.4 AMTRAK CORE VALUES

Do the right thing

- Act safely
- Spend wisely
- Show integrity
- Protect the environment
- Embrace diversity and respect others

Excel together

- Innovate
- Create solutions
- Learn from each other
- Continuously improve
- Act with speed and simplicity
- Communicate and collaborate



Put customers first

- Actively engage
- Exceed expectations
- Serve our communities
- Be courteous and helpful
- Keep stations and trains clean

Do the Right Thing. This value must be central to everything we do. It starts with always being safe – for ourselves, our co-workers, and our customers. On a personal level, it means that we always act with integrity. Our stakeholders should know us as honest, trustworthy, and reliable – and we must spend Amtrak's money with the same care we use for our own. In dealing with other people, we are always respectful – and we recognize that we create the best ideas when we include people of different cultures, backgrounds, and viewpoints in our work. Finally, we do everything we can to protect our

environment. We owe it to future generations to reduce waste and reduce our carbon footprint. A lot of **"Do the Right Thing"** comes down to the Golden Rule – namely, that we must treat others as we would like to be treated.

Put Customers First. This value speaks to why we exist. Prudently taking good care of our customers is the essence of our mandate from Congress – and it is how we ensure our continued livelihoods with this company. Our team has a strong sense of service today. Our challenge is that we must continually act upon it. To **"Put Customers First,"** all of us must be actively engaged in the needs of our customers, all the time. This means we don't wait for a customer to ask for help. If we see someone struggling with baggage or looking uncertain on where to find their gate, we provide whatever assistance they need. We are always courteous and helpful, and we keep our stations and trains clean. In short, every time we interact with a customer, we must exceed their expectations.

Excel Together. This value speaks to teamwork and performance. Many elements go into building a strong and high-performing team. It starts with communication. We must work toward the same goals together – and we need to be talking with each other all the time about what's important, what needs to be done now, and how we can improve. We must also seek to learn from each other. Each of us has a set of unique strengths and expertise that we need to maximize for Amtrak to achieve its goals. And we should always look to improve – ideally by being innovative. Our customers demand modern solutions, and today's business environment requires speed and simplicity. In doing all these things, we will **"Excel Together"** – and there will be no limits to what we can accomplish.

1.5 AMTRAK SAFETY PROGRAM

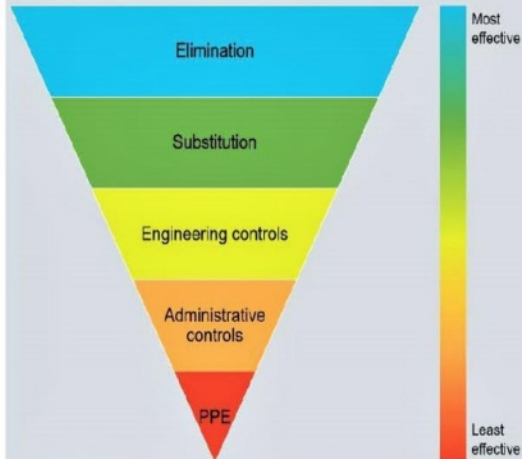




Just Culture principles

Human error	At-risk behavior	Reckless behavior
Inadvertent actions: slip, lapse, mistake	A choice: risk not recognized or believed justified	Conscious disregard of a substantial and unjustifiable risk
Manage through changes in: - Process - Procedures - Training - Design - Environment - Behavioral choices	Manage through: - Removing incentives for at-risk behavior - Creating incentives for healthy behaviors - Increasing situational awareness	Manage through: - Remedial action - Disciplinary action

Hierarchy of controls



Elimination: Physically remove the risk

Substitution: Avoid the hazard posing a risk

Engineering controls: Materially improve conditions

Administrative controls: Briefings, bulletins, testing, etc.

Personal Protective Equipment (PPE): Protecting against risk exposure

Safety Management System



The results pyramid

The **results** we achieve are directly impacted by the **actions** we take; the actions we take are influenced by the **beliefs** we hold; and the beliefs we hold are created by the **experiences** we share.



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SBI model



1.6 CORPORATE STRUCTURE

Amtrak is a large organization with over 24,000 employees. The Power Directors are in Amtrak's Electric Traction Department. The Power Directors interact with personnel in the Electric Traction Department throughout the Northeast Corridor.

Administrative, operation and payroll matters are currently handled through the Electric Traction Department's System Operations Office. Figure 1-5 shows where the Power Directors fall in Amtrak's Corporate structure.

1.7 ELECTRIC TRACTION'S MISSION

The function of the Electric Traction Department is to:

- Provide electric traction power for trains in a safe, economical, and reliable manner.
- Ensure integrity of the entire electrified territory.
- Initiate, maintain, and enforce standards for equipment maintenance and construction designs.

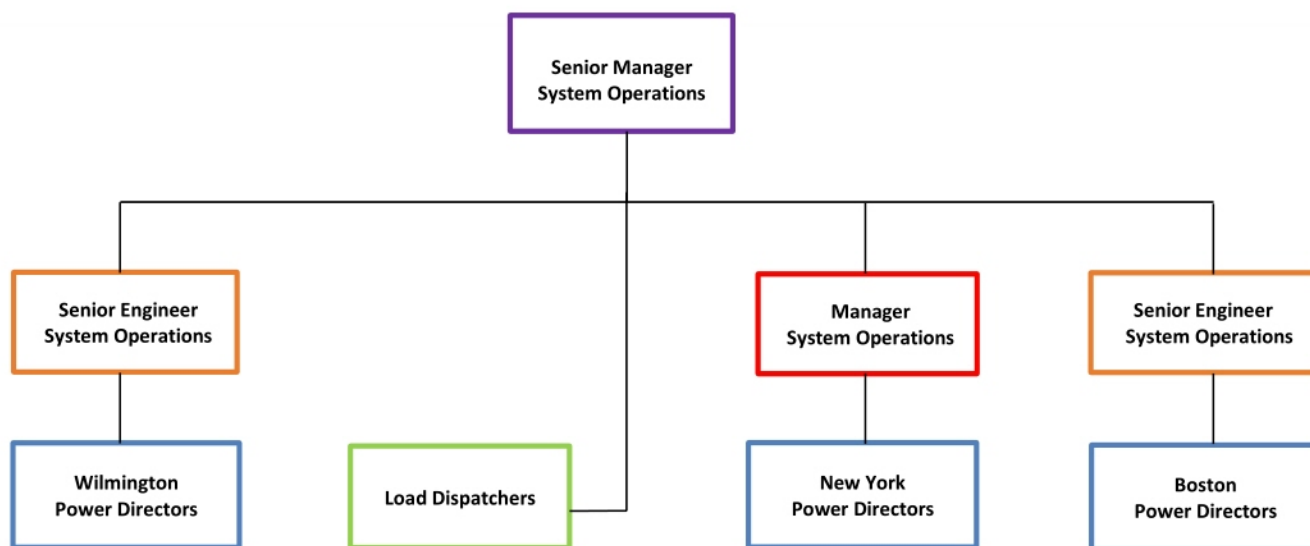


Figure 1-5. Electric Traction System Operations Organization Chart

1.8 INTERACTION WITH TRAIN DISPATCHERS

A Train Dispatcher is responsible for the movement of trains within an assigned territory. To move trains safely in all directions, Train Dispatchers need to know the following:

- The location of each train in the territory for which they are responsible.
- The tracks that are de-energized so that they do not permit an electric train into that section of the overhead catenary system.
- Track that may have foul time so as not to permit a train (electric or non-electric) into a section of track where personnel might be working.



Since electric trains run on the Electric Traction power system controlled by the Power Director, the Power Director will need to communicate all activities on the electrification system that will affect electric train movement to the Train Dispatcher. The primary activity under the control of the Power Director that will affect the movement of electric trains are the de-energization of a section of the overhead catenary or third rail protected by a plate order.

Under normal operating conditions, the Power Director needs to request and receive permission for a plate order from a Train Dispatcher-prior to removing power from the overhead catenary-or third rail. The Train Dispatcher knows the location of the trains, routes and schedules, therefore, knows when it is possible to de-energize a section of catenary and provide blocking from routing a train into a de-energized section of catenary or third rail.

The Power Director may issue an emergency plate order without the permission of a Train Dispatcher but must inform the Train Dispatcher immediately upon doing so. A potential emergency condition must exist before a Power Director takes such action. An emergency condition could be described as one where immediate de-energization of the overhead catenary is required when life or safety of equipment is compromised, or train movement could be impeded.

1.9 INTERACTION WITH LOAD DISPATCHERS

The Load Dispatcher monitors and regulates power demands for the 25 Hz electrification system. The Load Dispatcher position in Philadelphia manages the generation and 25 Hz (138 kV) transmission network as well as oversees the Hellgate section of Amtrak's electrified territory in New York. Managing these systems makes the Load Dispatcher responsible for:

- Maintaining continuity and availability of power for operation of trains.
- Interacting with utilities to monitor and control voltage levels and power levels.
- Issuing permits and switching orders to Power Directors for apparatus affecting Amtrak's 25 Hz (138 kV) transmission network and the Hellgate section.
- Directly supervise the safety of operation, resources, as well as the configuration and switching of the 25 Hz electrification system components.

Historically, the railroad has divided control of the Electric Traction system into two areas. Generation and (138 kV) transmission are the responsibility of the Load Dispatcher while distribution and substations are the responsibility of the Power Director. Power Directors have the actual supervisory control of substations. Power Directors operate apparatus, which affect Amtrak's 25 Hz (138 kV) transmission network, under the direction of the Load Dispatcher. All other apparatus which do not affect the transmission network is done under the direction of the Power Director.

Load Dispatchers supervise manned frequency converter locations to switch and to alter generator parameters. There is currently one Load Dispatcher Office. The office is located in Philadelphia, PA on the 4th floor of the Northeast corner of Amtrak's 30th Street Station.



Additionally, the Load Dispatcher is responsible for ensuring that the power needed to meet Amtrak's daily electrical train load is available. They achieve this goal by scheduling power resources from various electrical utilities and to a smaller extent by scheduling generation from Amtrak's converter stations. The Load Dispatcher ensures that the scheduled power supply is safely delivered to Amtrak's (138 kV) transmission network.

The Power Directors coordinate with the Load Dispatcher, ensuring that the trains run with power supplied to the overhead catenary system. The Power Director notifies the Load Dispatcher of all failures or incidents that affect the electrification system operation.

1.10 DIVISIONS WITHIN THE ELECTRIC TRACTION DEPARTMENT

Electric Traction Department personnel are spread throughout the entire Northeast Corridor territory. The department consists of managers who are responsible for overseeing the design, ongoing construction, and maintenance of the entire electrified territory. Specifically, managers have responsibility for:

- Operations and maintenance.
- 138 kV transmission system.
- The overhead catenary system.
- Amtrak substations.
- Amtrak converter stations.
- Signal power system.
- Third rail system.
- The SCADA system to monitor and control the electrified territory.

Division managers responsible for maintenance and construction each have control over specific regions within the Northeast Corridor, namely the:

- New England Division- East which is headquartered in Boston, MA
- New England Division- West which is headquartered in Groton, CT
- New York Division- East which is headquartered in New York, NY
- New York Division- West which is headquartered in Trenton, NJ
- Mid-Atlantic Division- North which is headquartered in Philadelphia, PA
- Mid-Atlantic Division- South which is headquartered at Quad Ave. in Baltimore, MD

The various Assistant Division Engineers, with the responsibilities described above, each have their own staff to ensure that inspections and maintenance of the equipment are up to date as well as various project goals are met. It should be noted that the splits for each division are as follows: The Mid-Atlantic Division is MP 29.3, north of Ragan, the New York Division is MP 3.2, east of Bergen, and the New England Division is W83 Richmond Switching Station MP 150.10.

SECTION 2

POWER DIRECTOR OFFICES

A Power Director operating zone is a geographical section of the Amtrak electrified system whose switching, and monitoring operations are conducted under the direction of the Power Director. Amtrak's Northeast Corridor is divided up into eight operating zones. The eight operating zones are controlled by Power Directors in offices in Boston, MA; New York, NY and Wilmington, DE. The zones are numerically identified from 1 through 10 and it should be noted that there is no Zone 7 or 9.

There are currently three (3) Power Director Offices:

1. Boston, MA
2. New York, NY
3. Wilmington, DE

2.1 BOSTON POWER DIRECTOR OFFICE

The Boston Power Director Office, as shown in Figure 2-1, monitors and controls Zone 10. There are two Power Directors on shift at any given time in the Boston Office. The geographical control area of Zone 10 is split into two geographical territories. Zone 10 East extends from South Station in Boston, MA MP 228.9 to W83 Richmond Switching Station MP 150.10. Zone 10 West extends from W83 Richmond Switching Station MP 150.10 to the Division Post MP 72.9 in New Haven, CT.

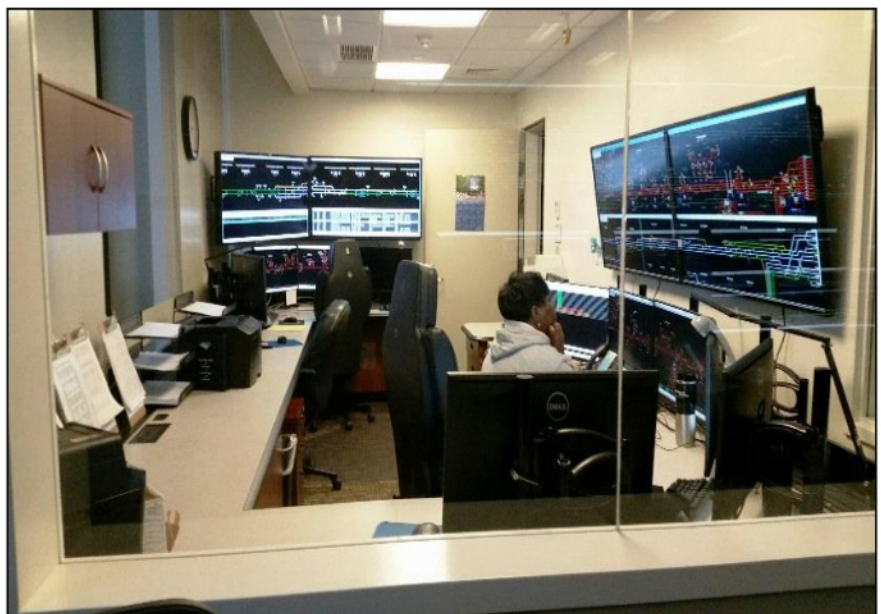


Figure 2-1. Zone 10 East and West Power Director Desks

Zone 10 is unique from the other Power Director zones in that it is a single phase, 60 Hz 2×25 kV constant tension overhead catenary system consisting of four traction power substations, three switching stations, and eighteen paralleling stations strategically located between New Haven, CT and Boston, MA.

The Boston Power Director Office is located in downtown Boston inside South Station. This office contains a SCADA operated control board that displays the condition of high voltage circuits and components relating to Amtrak's 1 ϕ , 25 kV, 60 Hz traction power system between New Haven, CT and Boston, MA. This allows the Power Directors information to make adjustments based on constantly changing conditions. The functionality of this office is critical to the continued operation of Amtrak trains. The Load Dispatcher does not issue any permits on any of the equipment or circuits to the Zone 10 Power Director.

2.2 NEW YORK POWER DIRECTOR OFFICE

The New York Power Director Office monitors and controls Zones 1, 2 and 3. There are usually two Power Directors on shift at any given time in the New York Office. One Power Director has responsibility for Zone 1, another has responsibility for Zones 2 and 3. Occasionally the zones can be split due to excessive workload or when inclement weather is predicted.

The Zone 1 Power Director geographic limits extend from MP 18.7, west of CP 216 to MP 3.2, east of Bergen. Figure 2-2 shows the Zone 1 Power Director desk.

Zone 1 is unique from the other Power Director zones in that it is the only zone that is responsible for Amtrak's DC Third Rail system.

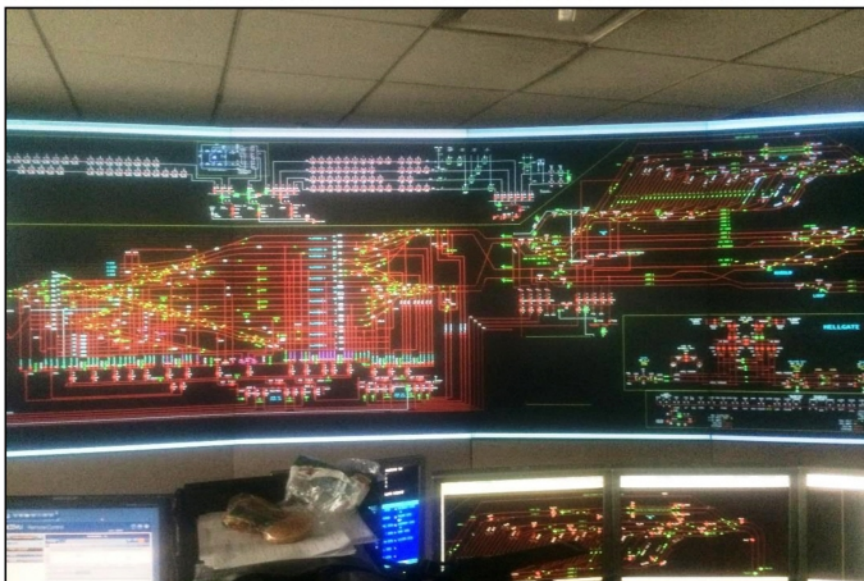


Figure 2-2. Zone 1 Power Director Desk

The Zone 2/3 Power Director geographic limits extend from MP 3.2, east of Bergen to MP 76, east of Holmes. Figure 2-3 shows the Zone 2/3 Power Director desks. There is only one Power Director that controls both zones at a given time.

The New York Power Director Office is located in Midtown Manhattan, NY in the Claytor-Scannell Control Center building. This office contains a SCADA operated control board that displays the condition of high voltage circuits and components relating to Amtrak's 25 Hz & Hellgate traction power and signal systems as well as Amtrak's DC third rail. This allows the Power Directors information to make adjustments based on constantly changing conditions. The functionality of this office is critical to the continued operation of Amtrak trains.

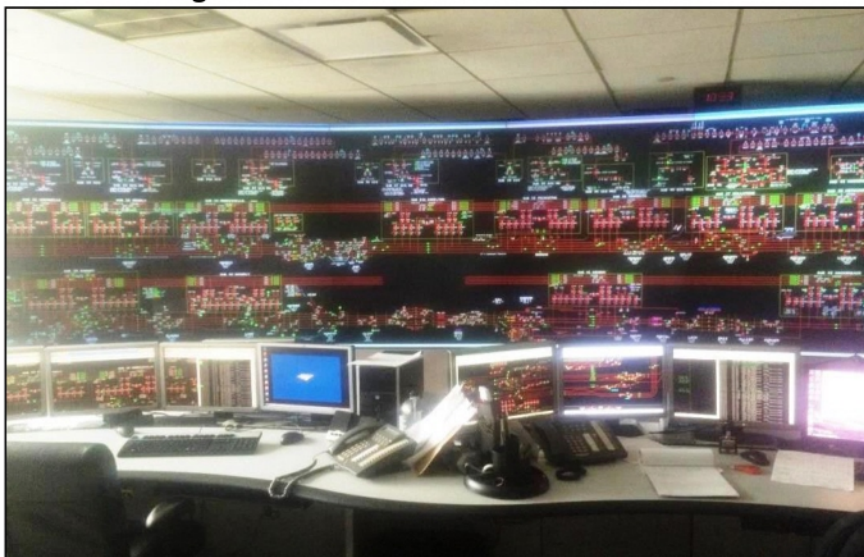


Figure 2-3. Zones 2 and 3 Power Director Desks

2.3 WILMINGTON POWER DIRECTOR OFFICE

The Wilmington Power Director Office monitors and controls Zones 4, 5, 6 and 8. There are four Power Directors on shift at any given time in the Wilmington Office.

The Zone 4 Power Director geographic limits extend from MP 76, east of Holmes to Glenolden MP 8.1 and MP 21.3, west of Paoli.

Zone 8 geographic limits extend from MP 21.3, west of Paoli to Harrisburg MP 104. Figure 2-4 shows the Zone 4 and Zone 8 Power Director desks.



Figure 2-4. Zone 4 and 8 Power Director Desks

The Zone 5 Power Director geographic limits extend from Glenolden MP 8.1 to Gunpow MP 79.5.

Zone 6 geographic limits extend from Gunpow MP 79.5 to Washington MP 136. Figure 2-5 shows the Zone 5 and Zone 6 Power Director desks.

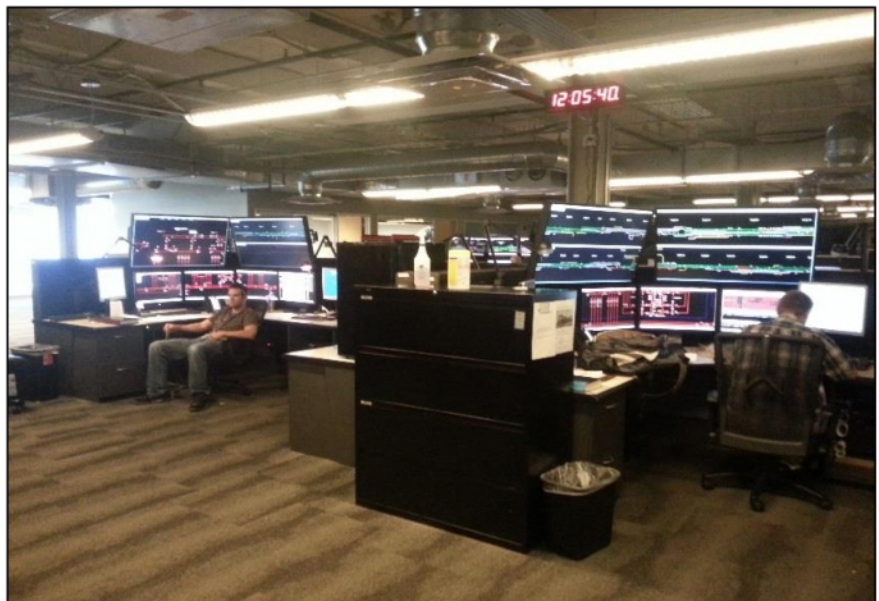


Figure 2-5. Zone 5 and 6 Power Director Desks

The Wilmington Power Director Office is located in Wilmington, DE on the first floor of the CNOC

Building. This office contains a SCADA operated control board that displays the condition of high voltage circuits and components relating to Amtrak's 25 Hz traction power and signal system. This allows the Power Directors information to make adjustments based on constantly changing conditions. The functionality of this office is critical to the continued operation of Amtrak trains.

**SECTION 3****25 HZ ELECTRICIFICATION SYSTEM OVERVIEW**

To better understand the entire scope and operation of the 25 Hz electrification system, it is helpful to view and study the system as being comprised of the following seven elements independently:

1. Power Generation
2. Step-Up Substations
3. Power Transmission
4. Step-Down Substations
5. Switching Stations
6. Catenary System
7. Signal Power System

3.1 POWER GENERATION

The Amtrak electrification system is a 25 Hz, single-phase type. Therefore, it is necessary to generate 25 Hz power or convert conventional 60 Hz, three-phase power, by either hydro, mechanical, or power electronics technology. Frequency converters, mostly synchronous-motor, synchronous generator sets but more recently static types, take commercial 3 ϕ , 60 Hz and convert it to 1 ϕ , 25 Hz power.

Amtrak currently employs three methods of power conversion or generation, at six strategic locations throughout the interconnected system. They are rotating frequency converters (RFC), hydro-electric generators (water wheels), and static frequency converters (SFC) of the Cyclo and DC link type design. The output of power to the transmission system is measured in megawatts (1 million watts).

Amtrak's six 25 Hz converter stations are located at Jericho Park in Bowie, MD; Lamokin in Chester, PA; Safe Harbor in Conestoga, PA; Richmond in Philadelphia, PA; Metuchen in Metuchen, NJ and Sunnyside in Queens, NY. The frequency converters at Lamokin are of the rotating type. Safe Harbor is a 25 Hz hydro-electric generating facility with one 25 megawatt (MW) RFC. Jericho Park, Richmond and Sunnyside are static frequency converters. Metuchen employs both a rotating unit as well as two static converters.

The Load Dispatcher is responsible for the monitoring and the regulation of the power demands for the 25 Hz electrification system between Queens, NY and Washington, DC as well as Philadelphia to Harrisburg, PA.

Rotating Frequency Converters

Rotating frequency converters are large motor generator sets consisting of a 60 Hz, three-phase motor with a 13.8 kV input that drives a 25 Hz, single-phase generator with an output of 13.2 kV. The mechanical energy of the motor drives a shaft coupled with the generator to produce the electrical energy required for distribution to the step-up station. A generator circuit breaker connects the output source to a (13.2 kV) bus section at the step-up station. Figure 3-1 shows a Lamokin 60 Hz, three- phase motor being rehabbed.



Figure 3-1. Lamokin 60 Hz, Three-Phase Motor

Hydro-Electric Generators

Hydro-electric generators connected to the Amtrak system consist of direct water-driven Kaplan type turbine generators located at Safe Harbor's Waterpower facility in Conestoga, PA. The kinetic energy of the river flow is utilized to drive the generators, thus providing the mechanical energy required to create an electrical energy output from the generator. A generator circuit breaker connects the output source to a (13.2 kV) bus section at the step-up station. Figure 3-2 shows Safe Harbor's water-driven Kaplan type turbine generators.



Figure 3-2. Safe Harbor's Water-Driven Kaplan Type Turbine Generators

Static Frequency Converters

Static (solid-state) frequency converters employ power electronics technology by converting the 60 Hz, three-phase sine wave to form a 25 Hz, single-phase, output. Figure 3-3 shows a Richmond PCI module.

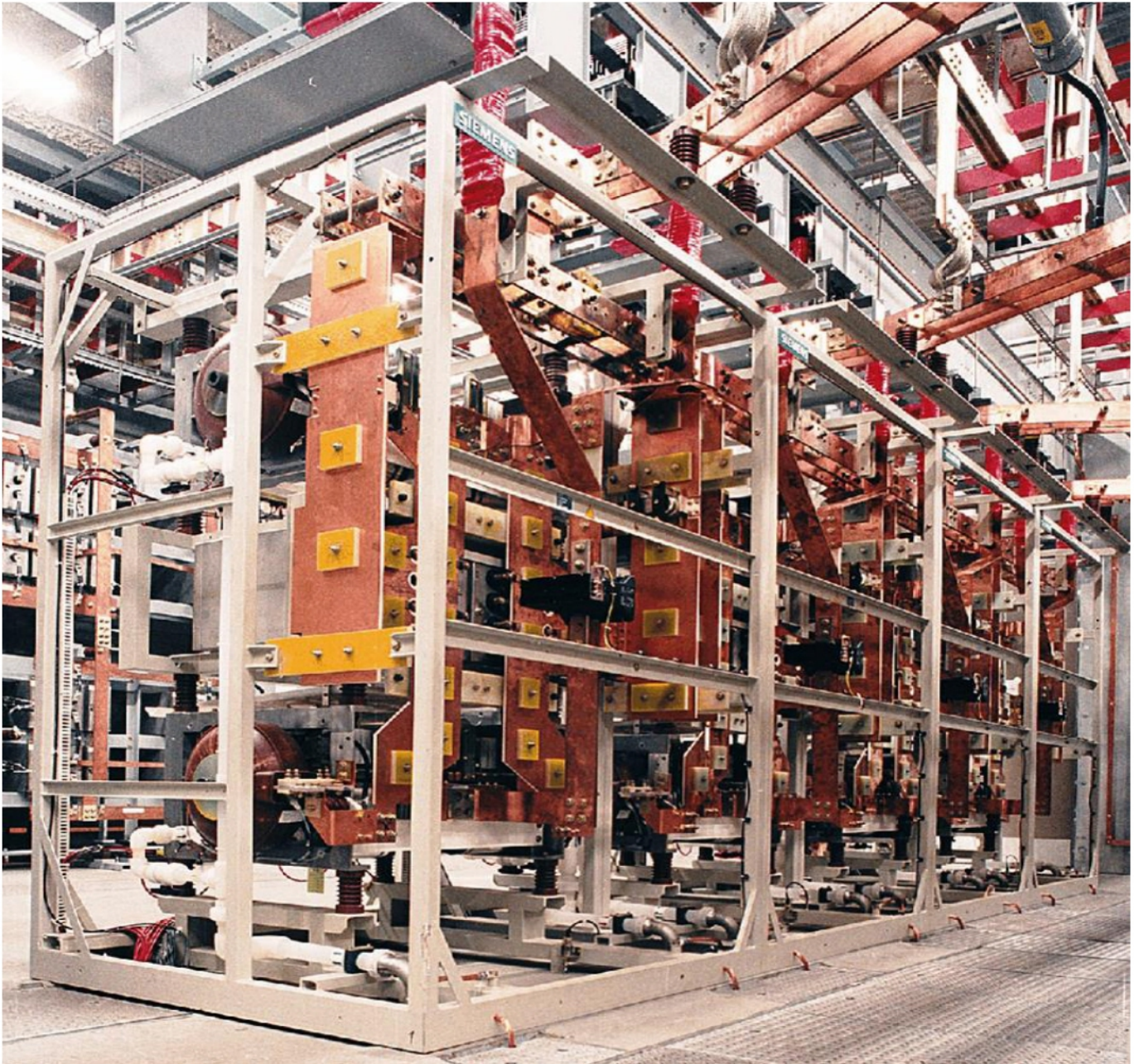


Figure 3-3. Richmond PCI Module



Utilities

There are five utilities that supply power to six locations (along the Northeast Corridor). These utilities are:

- Philadelphia Electric Company (PECO Energy)
- Public Service Electric & Gas of New Jersey (PSE&G)
- Baltimore Gas & Electric (BG&E)
- Brookfield Renewable
- Consolidated Edison of New York (CON-ED)

The delivery point locations are listed in Table P-1 below. Amtrak owns, operates, and maintains the Sunnyside, Richmond, Jericho Park and Metuchen converter stations.

Table P-1. Power Generation Data

Location	Utility	Units	Type	Rating	Total Cap
Sunnyside	CON-ED	4	DC Link SFC	7.5 MW ea.	30 MW
Metuchen	PECO/ PSE&G	1	RFC	25 MW ea.	25 MW
Metuchen	PSE&G	2	SFC	30 MW ea.	60 MW
Richmond	PECO	5	DC Link SFC	36 MW ea.	180 MW
Lamokin	PECO	3	RFC	20 MW ea.	60 MW
Safe Harbor	Brookfield	2	Hydro-Gen	32 MW ea.	64 MW
Safe Harbor	Brookfield	1	RFC	25 MW ea.	25 MW
Jericho Park	BG&E	2	Cyclo SFC	10 MW ea.	20 MW
Total		20			464 MW

Except for the 25 Hz single phase water wheels, all other power is provided by the means of frequency converters onto the 25 Hz Amtrak electrification system. The supply voltage from the utilities is supplied at various nominal voltages. (13.8 kV, 69 kV, 138 kV or 230 kV.) The Load Dispatcher is responsible for maintaining a steady state system condition, the monitoring and control of system voltage, and meeting load requirements for the propulsion of electric trains.

Generation from each station is scheduled to provide for a demand output capacity, for different blocks of time, within a 24-hour period. Jericho Park, Richmond, Metuchen (SFCs only), and Sunnyside static frequency converters are controlled by an independent SCADA system in the Load Dispatcher Office. The remaining stations are monitored by the Load Dispatcher but operated via local control by utility station operators.

3.2 STEP-UP SUBSTATIONS

Step-up substations are located near the generation sources. They consist of an arrangement of switchgear, breakers, and transformers that step-up power from 13.2 kV to 138 kV (line to line, single phase) for transmission onto Amtrak lines. Amtrak Load Dispatchers and Power Directors often interact with utility company personnel for switching and maintenance at the step-up stations. Figure 3-4 below shows the Lamokin Step-Up Yard.



Figure 3-4. Lamokin Step-Up Yard

Step-Up Transformers

Step-up transformers provide the means to step-up power generation from 13.2 kV – 138 kV for transmission and transmit (138 kV) power from the step-up stations out to the Amtrak power transmission system.

Step-up transformers typically have three high side bushings. An "A" & "B" phase at (69 kV) each and a neutral bushing. The neutral bushing is the central point of each transformers high voltage winding and is connected to the neutral ground resistor (NGR) which is connected to ground by a 330-ohm resistance. The (NGR) is part of a relay protection scheme which in case of a transmission line ground, limits the ground current to 200 amperes. Below in figure 3-5 is a picture of a step-up transformer at Lamokin.



Figure 3-5. Lamokin Step-Up Transformer



Table P-2 lists the data for the step-up stations that supply the Amtrak electrification system.

Table P-2. Step-Up Station Data

Location	Transformer	Rating	Line Fed
Jericho Park	11	25 MVA	123
	22	25 MVA	223
Safe Harbor	P2	20 MVA	11
	P3	20 MVA	32
	P4	20 MVA	41
	P5	20 MVA	52
	P6	20 MVA	61
	P7	20 MVA	71
	P8	20 MVA	82
Lamokin	51S	20 MVA	112
	4	20 MVA	112A/212A/102
	62	20 MVA	211
	12	20 MVA	211/102
	11	20 MVA	111A
	52	20 MVA	211A
	51N	20 MVA	111/102
Metuchen	11	20/ 24 MVA	138
	23	20/ 24 MVA	338
	24	20/ 24 MVA	438
	32	20/ 24 MVA	238

3.3 POWER TRANSMISSION

The Amtrak (138 kV) power transmission system consists of approximately 940 miles of transmission lines and 10.5 miles of vaulted or underground cable. From the step-up stations, the transmission conductors, two phases each line of 4/0, 7-strand copper, or equivalent conductor, tap onto the system at supporting structures classified as poles or structures. The lines are attached to a cross arm at the top of the structures by transmission suspension insulators that typically consist of 11 or 13 porcelain or composite bells.

The majority of transmission lines are aerial and along the right of way, however in some areas they may be overland for some distances, vaulted, or underground due to certain limitations or restrictions. As is the case of the (138 kV) solid dielectric in the B&P and Union Tunnels in Baltimore, MD that extends from Appleton St. (121, 221 lines) on the South end, to Bond St. (120 & 220 lines) on the North end.

The (138 kV) transmission network is segregated at three locations by normally open air break tie switches. They are located at Sub 16 Perryville (176 and 276), Lamokin Step-Up Station (621, 22A, 415, 11A) and Sub 30 Frankford (22HT). There are also (138 kV) phase breakers located at Perryville and Thorndale. This configuration is necessary to isolate different sources of power and prevent cascading unscheduled outages on the system. The protective relays for the (138 kV) phase breakers (R19 and R29) at Sub 9 Zoo have been removed. The breakers only function as sectionalizing devices. Figure 3-6 below shows a portion of the 25 Hz transmission system.



Figure 3-6. 25 Hz Transmission System



3.4 STEP-DOWN SUBSTATIONS

Along the right of way (ROW) step-down substations are strategically located 8-10 miles apart for secondary distribution of power to the (12 kV) catenary system, for the propulsion of electric trains. The (138 kV) transmission lines enter the substations through an arrangement of (138 kV) air break and air break tie switches that provide the means to sectionalize, ground, or reconfigure sections of the transmission network.

Droppers tap off the (138 kV) bus to the high side switches that are used to isolate the primary side of the (4500 kVa) step-down transformers. There the voltage is transformed by mutual induction to the secondary winding to obtain a nominal (output) voltage of 12 kV, roughly an 11.5 to 1 ratio. A low side breaker protects the secondary side of the transformer from fault current flowing back from the (12 kV) bus section and protects the bus section from fault current flowing from the transmission line or transformer internal fault. A typical arrangement is a single transformer being fed from a single transmission line, to a respective (12 kV) bus section. There are normally two or more (12 kV) single bus sections connected through bus tie breakers (BB) that maintain continuity of the catenary circuits through the station. This continuity is sometimes referred to as being the third or fifth (NYD Division) transmission circuit.

Trolley breakers are connected to the (12 kV) bus sections through a set of bus and feeder (B&F) disconnects, which isolate the trolley breakers from the bus section and trolley taps. The trolley tap is made through the trolley (T) disconnect; however, some locations may also have a line (L) switch in a circuit that is being fed at some distance from the substation. Figure 3-7 shows a simple one-line drawing of a step-down substation. Figure 3-8 is a picture of Sub 64 Frazer on the Harrisburg line.

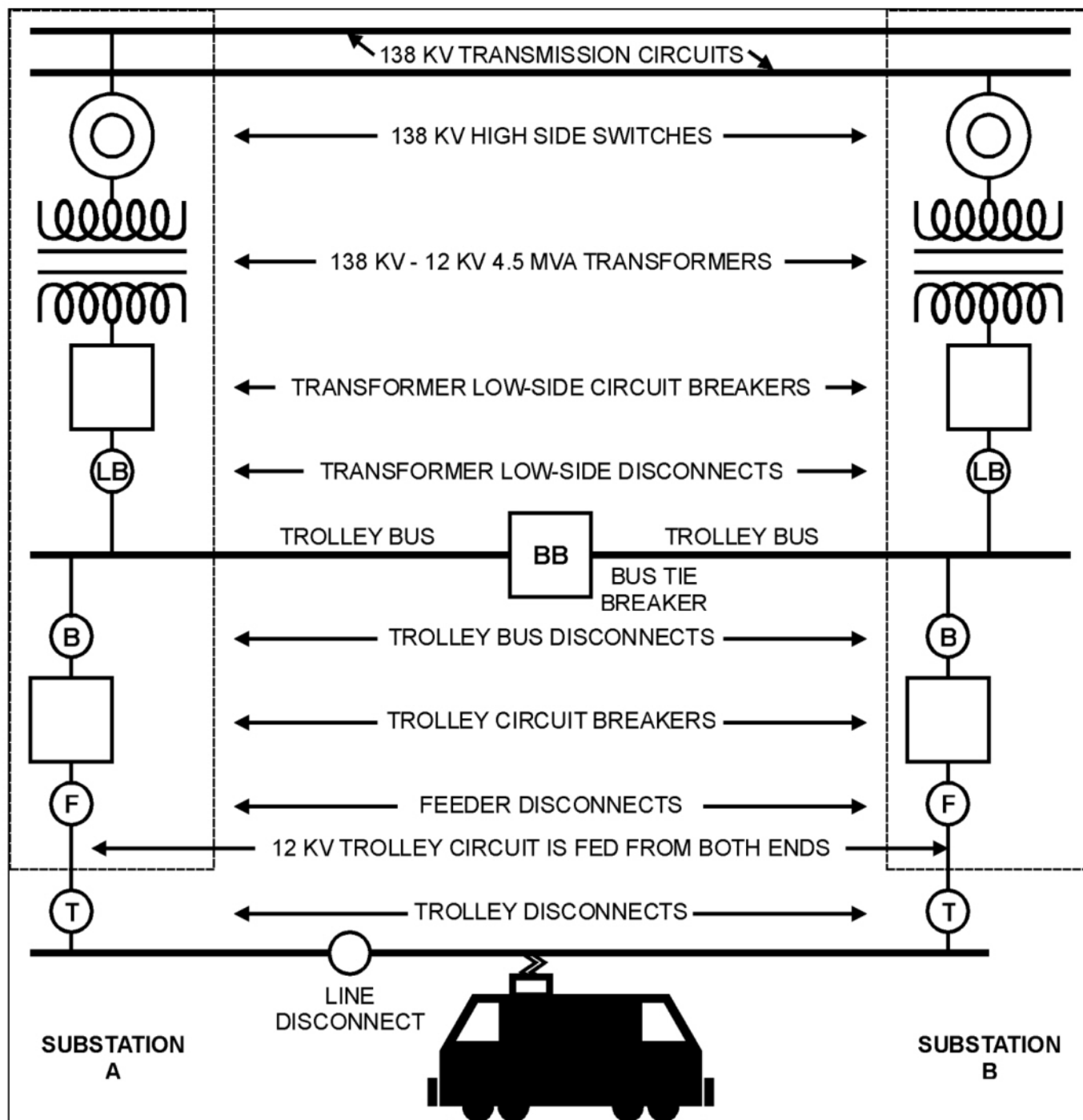


Figure 3-7. 25 Hz 1φ Step-Down Substation Configuration



Figure 3-8. Sub 64 Frazer

3.5 SWITCHING STATIONS

Switching stations are an arrangement of feeders, breakers and switchgear designed to maintain continuity or isolate between substations and strategically located in high volume traffic areas where it may not be practical or necessary to have power transformers. Switching stations are locations normally fed by two or more feeders, either lines or cables that deliver the primary source of power to the station bus sections. A typical location may have a group of Master breakers that feed a Low Rupture bus section and subsequent low rupture circuits (I.E. Sub 25A Union and Sub 43 Penn Station 31st and 7th Ave.).

Relay protection is set up so that a fault trips the Master breaker and the Low Rupture breaker associated with the faulted circuit. The Master breaker will re-close automatically after the faulted Low Rupture breaker (LRB) is cleared; thus, restoring power to the remaining LRBs connected to that bus section. Sub 03 Bryn Mawr, Sub 06 North Philadelphia and Sub 44 Sunnyside are also examples of switching stations but there is no Master – Low Rupture breaker set-up. These switching stations provide power to the (12 kV) bus sections via trolley circuits energized from adjacent step-down substations. Figure 3-9 is a picture of Sub 44 Sunnyside.



Figure 3-9. Sub 44 Sunnyside

3.6 CATENARY SYSTEM

The 1 ϕ , 12 kV, 25 Hz overhead catenary system between Queens, NY and Washington, DC as well as Philadelphia to Harrisburg, PA is comprised of several different design types and configurations according to location and application. Typically, a two or three wire arrangement supported under tension at structures by hardware and isolated by insulators, sectionalizing switches, section, and phase breaks. The contact or riding wire allows for the continuous collection of current from the pantograph carbon strips mounted to the train. The rail return allows for a path from the rail back to the substations for the return current to complete the path of the electrical circuit. Figure 3-10 below is a typical 25 Hz fixed tension catenary system.



Figure 3-10. Typical 25 Hz Fixed Tension Catenary System

Section Breaks

Section breaks allow for the smooth transition from one electrical circuit to another and are only electrically connected when the pantograph is bridging both sides of the break, or jumpered at a sectionalizing switch. Figure 3-11 below shows a section break.



Figure 3-11. Section Break

Phase Breaks

Phase breaks provide the means to isolate different sources of power that may not be synchronous and should not be electrically connected at that location. The trolley breakers at Perryville and Thorndale are normally closed. When a phase break indicator (Rosette) is lit, the Train Dispatcher shall be notified immediately. Figure 3-12 below shows the phase breakers at Perryville.



Figure 3-12. Phase Breakers at Perryville

Interlocking Locations

Interlocking locations are strategically located to provide for the diversion of train traffic and the isolation of catenary circuits relative to the track with sectionalizing switches. Figure 3-13 below is D section at 34th Street Philadelphia.



Figure 3-13. D Section at 34th Street Philadelphia

Impedance Bonds

Impedance bonds are located in the track gage near the substations and impede the flow of signal circuit current and allow for the continuous flow of rail return current. Figure 3-14 shows an impedance bond.



Figure 3-14. Impedance Bond

3.7 SIGNAL POWER SYSTEM

The signal power system operates at a frequency of 91 2/3 Hz or 100 Hz that is transmitted at 2300V (Hackensack to Gate)-3300V (Zoo to Paoli)- 6900V to 7200V (Washington, DC to Hackensack, NJ and Philadelphia to Harrisburg, PA) via cable or bare conductor suspended from the support structures or buried along the ROW. Primary power for the signal system originates at substations or locations equipped with rotating and/or solid-state frequency converters (signal machines), as shown in Figure 3-15, that utilize a 25 Hz or 60 Hz – 440V input to a motor that drives a 91 2/3 Hz or 100 Hz – 440V generator. The output of 91 2/3 Hz or 100 Hz signal power is then transformed to the desired voltage for transmission out to the signal power system. Signal feeder and tie breakers protect the equipment and line segments and direct the feed to achieve the desired configuration for each segment of the signal power system. The system is designed to respond and operate automatically in case of a fault or failure at either end of a particular segment.

If an undervoltage condition is indicated due to fault or failure, an adjacent tie or feeder breakers will sense this condition and respond by closing automatically if not locked out. Lock out relays on the feeder and tie breakers allow the Power Director to maintain more control under these conditions thereby not allowing the system to feed continuously into a fault.

Cut sections and signal locations are strategically located to tap off of the primary signal power line and provide the 110V/220V power via a step-down transformer for communication and signal functions (C&S) as well as a means to sectionalize and isolate segments of signal power system. The C&S Department is responsible for the secondary side. Figure 3-16 on the next page is a cut section at Cork Interlocking on the Harrisburg line.

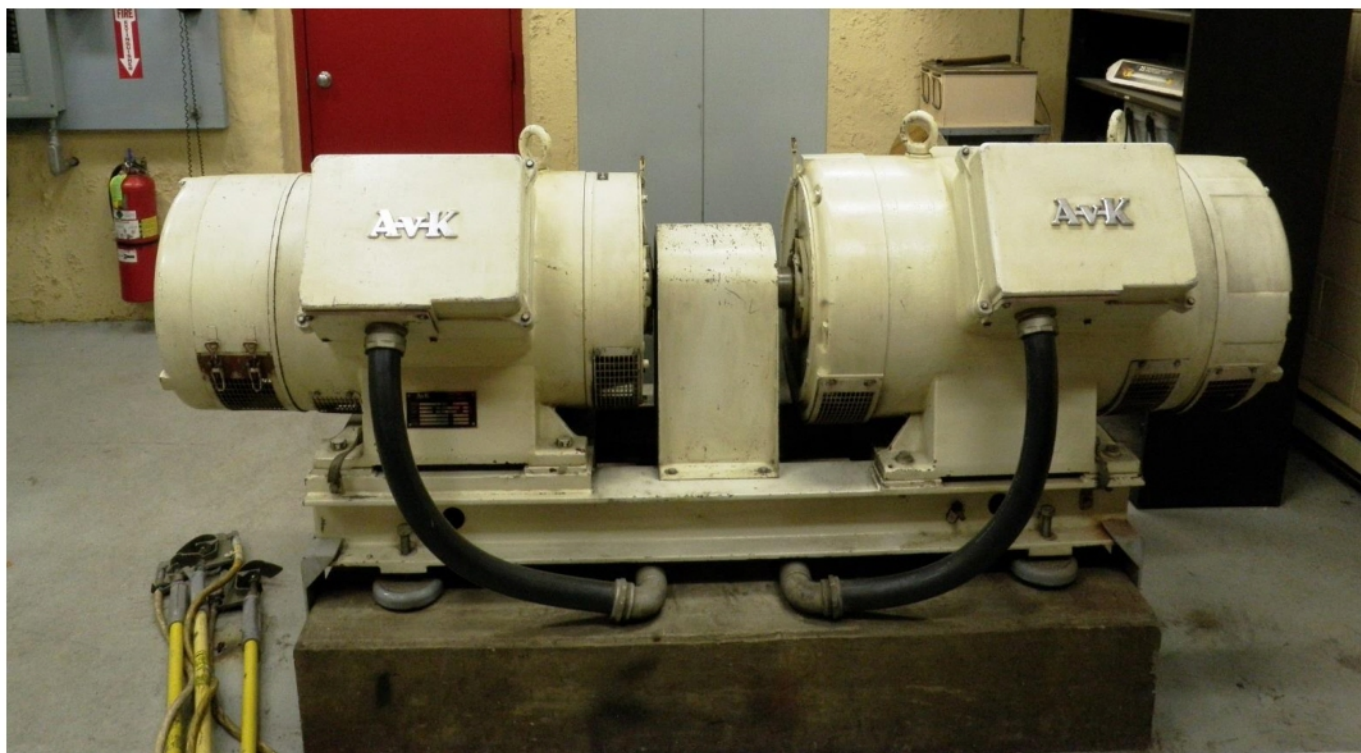


Figure 3-15. Signal Machine



Figure 3-16. Cut Section at Cork Interlocking

SECTION 4

THIRD RAIL ELECTRICIFICATION SYSTEM OVERVIEW

In addition to the overhead catenary system, Amtrak maintains a Third Rail system in the New York terminal area to serve Amtrak's Empire line dual-mode (diesel/third rail) trains as well as Long Island Railroad Third Rail trains. Amtrak's Third Rail territory extends from the North River Tunnels into Penn Station, NY through the East River Tunnels to Harold Interlocking and Sunnyside Yard. A short segment of Third Rail also exists through the North Access Tunnel for the Empire Connection. Figure 4-1 shows an Amtrak train on the Empire line in route to Niagara Falls.



Figure 4-1. Amtrak Empire Service Train Passing Philipse Manor Train Station in Route to Niagara Falls

The primary difference of the Third Rail system is the use of direct current (DC) rather than the more commonly used alternating current (AC). Because of this, the substation design is different. Incoming commercial power supply is three phase AC, but after being stepped down by a station transformer the power is then changed to DC by means of a rectifier. 750V DC power is then distributed through substation breakers and onto the Third Rail system. Figure 4-2 below illustrates the Third Rail system's components.

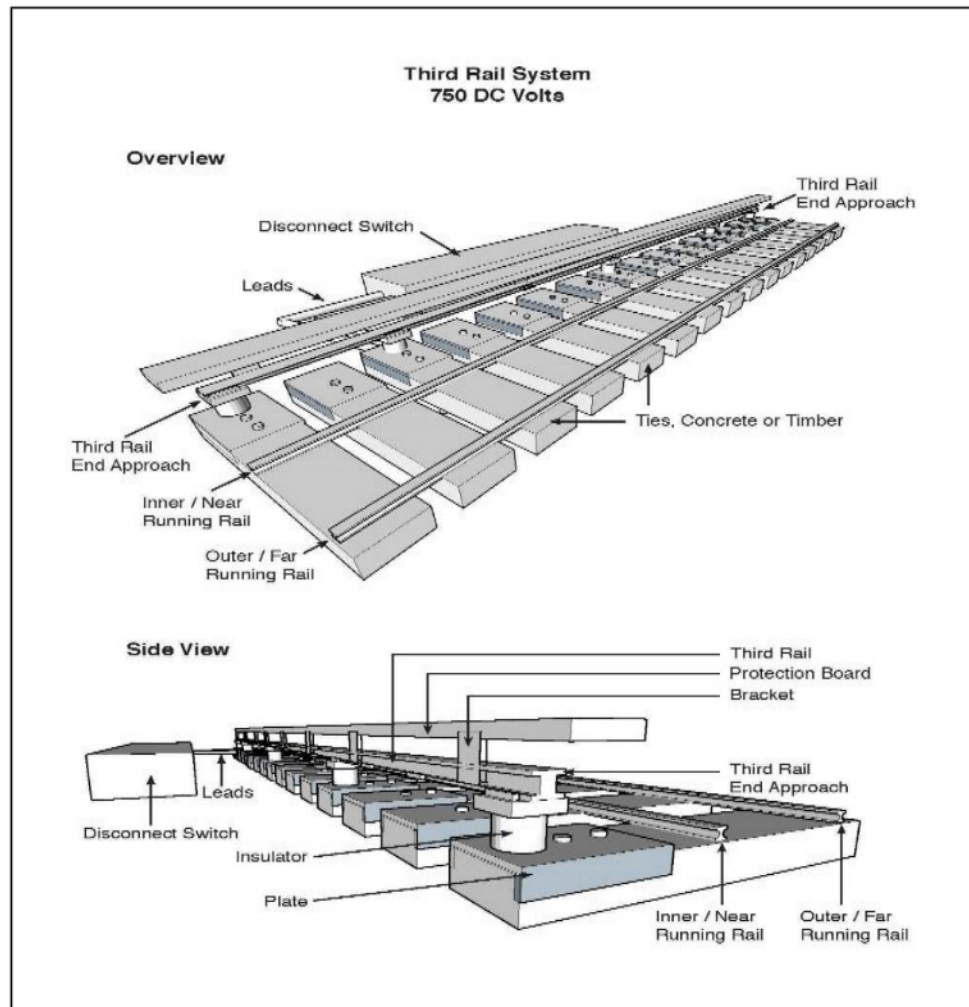


Figure 4-2. Third Rail System Components



SECTION 5

HELLGATE ELECTRIFICATION SYSTEM OVERVIEW

The Hellgate section of Amtrak's electrification system spans from the phase breaks at Gate to the phase breaks at New Rochelle. This section is approximately 13 miles long. The section is energized at 1 ϕ , 12.5 kV – 60 Hz. There is a feeder and trolley for each circuit with the trolley to feeder voltage at 25 kV. The trolley or feeder voltage to ground is 12.5 kV. It is a two-track operation with one interlocking. This section of the electrification is under the control of the Zone 1 Power Director located in Midtown Manhattan.

The electrified portion of the Northeast Corridor extends beyond New Rochelle, NY to New Haven, CT. Amtrak operates trains over the route, however; this section of the Northeast Corridor from New Rochelle, NY to New Haven, CT is owned and maintained by Metro-North Commuter Railroad. This section is electrified at 1 ϕ , 12.5 kV, 60 Hz power. Amtrak is Metro-North's tenant over this segment. Amtrak has no operating or maintenance responsibility for the Metro-North owned section.

To better understand the entire scope and operation of the Hellgate section of the electrification system, it is helpful to view and study the system as being comprised of the following four elements independently:

1. Power Supply
2. Paralleling Stations
3. Catenary System
4. Signal Power System

5.1 POWER SUPPLY

The 1 ϕ , 12.5 kV, 60 Hz Hellgate system between Gate and New Rochelle is supported by only one electrical substation; Sub 46 Van Nest. Power is received from Con-Edison via two (138 kV) transmission lines. The power is stepped down to 12.5 kV by the means of two- 22.5 MVA transformers. The transformers are both equipped with a high side and low side oil circuit breakers. Both high side oil circuit breakers (OCB) are closed. One low side OCB is open and one low side OCB is closed to energize a bus section. There are four trolley/feeder circuits off the bus. There are two circuits between Sub 46 Van Nest and Sub 45 Bowery Bay. There are two circuits between Sub 46 Van Nest and Sub 47 New Rochelle. Figure 5-1 on the next page is a picture of Sub 46 Van Nest.



Figure 5-1. Sub 46 Van Nest

5.2 PARALLELING STATIONS

There are two paralleling stations on the Hellgate; Sub 45 Bowery Bay and Sub 47 New Rochelle. Each station contains one BT breaker and two autotransformers, one per circuit. The BT will open on a fault to isolate the faulted circuit. Figure 5-2 below is a picture of Sub 47 New Rochelle.



Figure 5-2. Sub 47 New Rochelle

5.3 CATENARY SYSTEM

The overhead catenary on the Hellgate is of the fixed tension type. It is a three-wire construction, consisting of a messenger, trolley, and an auxiliary wire. Figure 5-3 below is an Amtrak train on the Hellgate system.



Figure 5-3. Amtrak Train on the Hellgate

5.4 SIGNAL POWER SYSTEM

The signal power is provided by two signal machines. The signal machines are located at Sub 45 Bowery Bay and Sub 47 New Rochelle. The machines have a 480V – 60 Hz input, which is provided by Con-Ed. The output of the machines is 480V – 100 Hz. The power is stepped up to 7200V for transmission over the 13 miles of signal line. The power is stepped down at strategic locations for use in signal circuits. Figure 5-4 shows the signal line on the Hellgate system.



Figure 5-4. Hellgate Signal Line



SECTION 6

60 HZ NORTH END ELECTRIFICATION SYSTEM OVERVIEW

To better understand the entire scope and operation of the 60 Hz North end electrification system, it is helpful to view and study the system as being comprised of the following five elements independently:

1. 60 Hz Power Supply
2. Step-Down Substations
3. Paralleling Stations
4. Switching Stations
5. Catenary System

6.1 60 HZ POWER SUPPLY

The 1 ϕ , 25 kV, 60 Hz system between New Haven, CT and Boston, MA is made up of eight independent electrical sections supported by four substations, spaced approximately 40 miles apart at Branford, CT; New London, CT; Warwick, RI; and Sharon, MA. There are two utilities that provide the interconnections to these four substation locations. These utilities are:

- Ever Source provides the 60 Hz/115 kV utility taps for the 2-40 MVA, 115/25 kV, 1 ϕ transformers at Sharon Substation in Sharon, MA.
- National Grid which provides the 60 Hz/115 kV utility taps for the 2-40 MVA, 115/25 kV, 1 ϕ transformers at Warwick Substation in Warwick, RI.
- Ever Source which provides the 60 Hz/115 kV utility taps for the 2-40 MVA, 115/25 kV, 1 ϕ transformers at New London Substation in New London, CT.
- Ever Source which provides the 60 Hz/115 kV utility taps for the 2-40 MVA, 115/25 kV, 1 ϕ transformers at Branford Substation in Branford, CT.

The transmission lines feeding the four substations on the New England Division belong to two supplying utilities. Between the four substations, there are three switching stations and eighteen paralleling stations spaced approximately four miles apart to provide additional support. These stations are needed to provide the means to maintain voltage levels and reduce the line losses between substations using autotransformers as well as paralleling the trolley circuits to maintain balance and even distribution of power resources. Because the Northeast Corridor between New Haven, CT and Boston, MA uses a 60 Hz power supply, there is no need for frequency converter stations in this part of the system.

6.2 STEP-DOWN SUBSTATIONS

As mentioned above, in the North end of the Northeast Corridor, utility taps are supplied from the two utility companies to the four substations as single phase 60 Hz power at a nominal voltage of 115 kV. Providing full redundancy, power is supplied to each section by a separate 40 MVA traction power supply transformer at the substations and supported by the 10 MVA autotransformers at paralleling and switching stations within each section. All power and autotransformers are center tapped to the rail return system and ground potential. The traction power supply transformers are fitted with load tap changers, which automatically maintain the system voltage within the specified operating limits.



Each 40 MVA traction power supply transformer can support the entire station requirements without service impacts. Power is supplied to the overhead catenary system directly from the substations via individual circuit breakers; and indirectly through a negative feeder system supplying the eighteen paralleling stations and three switching stations within each section. The catenary to feeder voltage is 50 kV and catenary or negative feeder to rail voltage is 25 kV.

Substation spacing is approximately 40 miles apart. The utility company owns, operates, and maintains that portion of the substation components from the high side bushing of the 40 MVA traction power transformers back to the incoming high voltage feeders. All other substation components are owned, operated, and maintained by Amtrak.

The (115 kV) lines enter the substation via line or cable and connect to the primary bushings of the 115-kV/25 kV step-down transformers. The transformers are protected on the primary side by SF6 gas circuit breakers or high side switches, and low side breakers on the secondary side. The transformer secondary winding has a center tap for the rail return, referencing ground potential. The nominal voltage on the secondary side is 25 kV from negative feeder to rail or catenary to rail, and 50 kV from catenary to negative feeder. The (25 kV) conductors enter the indoor substation enclosure via cable and connect to the low side breakers and then distributed to their respective (25 kV) bus sections. The bus tiebreakers are normally open to isolate the different sources of power which are out of phase.

Electric interlocks prevent the closing of any equipment that would connect separate power sources that may not be in phase. The distribution schemes for each substation are practically identical with one low side breaker, two trolley breakers, one service transformer and breaker per bus section. Outside the switch gear and control room enclosure adjacent to the right of way is a Gantry which has a series of motorized trolley/feeder and tie switches that offer flexibility for maintenance, sectionalizing and providing alternate feeds when required. A trolley/feeder ground switch and lightning arrester is also located on the gantry between the trolley breaker and the trolley feeder disconnects.

Located within the phase break of the overhead catenary system, there is a normally open motor operated phase break switch that is connected to the overhead catenary system on each track to electrically isolate the separate power sources.

Each device in the substation can be put in local control independent of each other. Power for control and indication status of equipment is achieved with a 125V DC battery bank and solid-state charger. A 25 kV to 110/220V step-down service transformer is connected to each bus section for station auxiliary functions. Figure 6-1 on the next page is a picture of Sub 86 Sharon.



Figure 6-1. Sub 86 Sharon

6.3 PARALLELING STATIONS

Paralleling stations are located between substations and switching stations and spaced approximately 4-7 miles apart. The eighteen stations provide the means to maintain voltage levels and reduce the line losses between substations using autotransformers. Additionally, paralleling the trolley circuits maintains balance and even distribution of power resources. Stations are identical except for Roxbury where there is a third main line track supported by an additional parallel breaker and autotransformer. Typically, there is a trolley breaker, motor operated trolley feeder disconnect switch, low side breaker and autotransformer for each circuit. Under normal system conditions the trolley circuits are in the parallel configuration. Figure 6-2 below is a picture of 84B Providence.



Figure 6-2. 84B Providence

6.4 SWITCHING STATIONS

Switching stations are spaced approximately 50 miles apart, located at the midpoint between substations and isolate the separate power sources on each side. The overhead catenary system circuits between the substation and a switching station consist of the elementary electrical sections as defined by the fault location and isolation system logic. In sections, where loading has been determined to be substantially higher, an additional autotransformer has been added to support these areas between Westbrook and Richmond. Figure 6-3 is a picture of W83 Richmond.



Figure 6-3. W83 Richmond

6.5 CATENARY SYSTEM

The North end overhead catenary system is a constant tension two wire (messenger and contact wire), design that compensates for changing temperature conditions with an overlap to balance weight arrangement for every one mile of catenary with the exception of South Hampton Street Yard which is a single wire system (contact wire only). Cantilever catenary poles approximately 35 feet tall and spaced approximately 70-200 feet apart are used to support the overhead catenary system. Catenary pole spacing is closer than normal on the New England Division to allow for the constant tension high speed operation. A mid-point anchor is a fixed point located between the set of balance weights for each catenary circuit. Adjustable stops are located within the pull-off arrangement at the balance weights and are set to allow for a registration arm movement of 12 inches before locking up in either direction coincident to changes in temperature. However, the system is designed to operate between -10°F and 110°F without lockup. Figure 6-4 below shows a typical balance weight assembly. Maintenance to hinged points and pulleys are critical to the operation of a constant tension system. Figure 6-5 on the next page shows the North end constant tension catenary system.



Figure 6-4. Typical Balance Weight Assembly



Figure 6-5. North End Constant Tension Catenary System

**USING THE POWER DIRECTOR OPERATING GUIDELINES MANUAL**

This Operating Guidelines Manual is a compilation of tasks relating to the operation of Amtrak's electrification system by the Power Directors. Each task is intended as a guideline only; each task will likely have to be modified to match each specific scenario in which it is used.

The manual is organized into 10 functional areas, each of which contains task outlines relating to the specific functional area.

In the case of a new Operating Guideline, the Senior Manager of System Operations- Electric Traction will assign a number to the new Operating Guideline, using the format: XXX-Y. Where XXX is the functional area and Y is the next sequential number. Numbers for an Operating Guideline will start with 1.

The following series are the functional areas for which a new Operating Guideline will be assigned.

- PDE Power Director Office Evacuation
- STO Shift Turnover
- FAR Forms and Reporting
- XTS Transmission System Operation
- SUB Substation Operation
- TRO Trolley Distribution System Operation
- SIG Signal Power System Operation
- SCA SCADA Operation
- SEP Septa Operation
- UER Unplanned Event Response

A listing of the tasks covered in each functional area may be found in the Table of Contents, as well as on the cover page for each functional area.

To use this manual, locate the task in the functional area containing the desired action. Then, simply follow the instructions. Keep in mind that no task can possibly cover every single scenario that will be encountered by a Power Director. However, if the provided tasks are modified as necessary to meet a scenario's circumstances, the tasks will fit all scenarios.

**TITLE: TABLE OF CONTENTS****Power Director Office Evacuation Tasks (PDE)**

Guideline	Version	Date	Title
PDE-1	01	09.30.22	Evacuating the Power Director Office
PDE-2	01	09.30.22	Returning to the Power Director Office

Shift Turnover Tasks (STO)

Guideline	Version	Date	Title
STO-1	02	05.08.19	Performing a Shift Turnover
STO-2	02	05.08.19	Receiving a Shift Turnover
STO-3	01	02.04.19	Performing a Review of Operating Zone
STO-4	00	02.04.19	Maintaining Shift Turnover Report

Forms and Reporting Tasks (FAR)

Guideline	Version	Date	Title
FAR-1	01	09.30.22	Maintaining Electric Traction Logbook
FAR-2	01	11.08.21	Requesting Vacation
FAR-3	00	05.08.19	Maintaining Out of Service Equipment Log
FAR-4	00	02.17.20	Maintaining Clearance Form NEC.84
FAR-5	00	10.01.20	Interpreting Planned Outage Application Form
FAR-6	00	10.01.20	Maintaining Outage Scheduler
FAR-7	00	09.30.22	Performing a Power Director Callout
FAR-8	00	09.30.22	Performing a Field Personnel Callout
FAR-9	00	09.30.22	Maintaining Electrical Work Permit Form NEC.85

Transmission System Operation Tasks (XTS)

Guideline	Version	Date	Title
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Substation Operation Tasks (SUB)

Guideline	Version	Date	Title
SUB-1	01	09.30.22	Issuing & Releasing a (12 kV) Trolley Circuit Breaker Clearance
SUB-2	00	09.30.22	Issuing & Releasing a (12 kV) Trolley Circuit Breaker including Lightning Arrester Clearance

Trolley Distribution System Operation Tasks (TRO)

Guideline	Version	Date	Title
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Signal Power System Operation Tasks (SIG)

Guideline	Version	Date	Title
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POWER DIRECTOR OPERATING GUIDELINES

Wilmington Office

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8/21/2025

Table of Contents

SCADA Operation Tasks (SCA)

Guideline	Version	Date	Title
SCA-1	00	09.16.21	Applying & Removing Enhanced Employee Protection System (EEPS)

SEPTA Operation Tasks (SEP)

Guideline	Version	Date	Title
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Unplanned Event Response Tasks (UER)

Guideline	Version	Date	Title
-----------	---------	------	-------

Appendix

Guideline	Version	Date	Title
A	02	02.04.22	Glossary
B	01	02.04.22	Abbreviations and Acronyms
C	01	02.04.22	2022 Wilmington Power Director Office Seniority Roster
D	01	04.28.22	National Attendance Policy
E	01	04.28.22	Time Entrance Reporting Policy (TED)



FOREWORD

The attached are the Amtrak Electric Traction Power Director Operating Guidelines. These guidelines should be used to assist Electric Traction Power Directors in the safe and efficient performance of their duties within the Electric Traction Department.

These guidelines make no attempt to anticipate all possible job circumstances. Special conditions will require that each employee utilize his or her experience and skills to work productively towards resolution of potential problems. These guidelines shall not restrict the initiative of any employee to develop improved methods of operation and are not a substitute for common sense and good judgment.

Whenever you are aware of an error with any of these guidelines, please notify the Senior Manager of System Operations– Electric Traction. Improvement to these guidelines will be made on a regular basis incorporating your comments and concerns.

A new Table of Contents will be issued with each new or revised Operating Guideline entry, documenting which Operating Guideline has been updated, the date revised, the version number and the reason for the change.

**SUMMARY OF CHANGES**

Date	Guideline	Page(s) Affected	Reason For Change
09.30.22	PDE-1, PDE-2	1	Updated to include Electrical Work Permit Form (NEC.85) in 3.0 references. Also, additional item to gather when leaving
09.30.22	FAR	All	Changed functional area from <i>Reports</i> to <i>Reporting</i> to allow for future Operating Guidelines on reporting requirements
09.30.22	FAR-1	All	Revised to include electronic version of logbook in Microsoft Access. Changed title of Operating Guideline from <i>Maintaining Power Director Logbook</i> to <i>Electric Traction Logbook</i>
09.30.22	FAR-7	All	Issued <i>Performing a Power Director Callout</i>
09.30.22	FAR-8	All	Issued <i>Performing a Field Personnel Callout</i>
09.30.22	FAR-9	All	Issued <i>Maintaining Electrical Work Permit Form NEC.85</i>
09.30.22	SUB-1	4, 6, 7, 9, 10	Updated to include added EEPS procedure
09.30.22	SUB-2	All	Issued <i>Issuing & Releasing a (12 kV) Trolley Circuit Breaker including Lightning Arrester Clearance</i>
04.28.22	Appendix D, E	All	Added the updated: (D) National Attendance Policy Dated: 06.29.21 (E) Time Entrance Reporting Memo (TED) Dated: 03.21.22
02.04.22	Appendix A	All	Added: autotransformer, Class "A" ET trainee, clearance form, DTMF- radio controlled track switches, insulated tool, Standard Operating Instructions, lightning arrester, enhanced employee protection system, three-part communication Updated: contractor, Class "A" qualified list to include C&S employees, fixed tension to fixed termination, Power Director
02.04.22	Appendix B	All	Added CB circuit breaker, CK check, DRI dead rail indicator, EEPS enhanced employee protection system, ELDISC electrical disconnect, GND ground, HEP head end power, N/A non-applicable, # or No. number, NYD-W New York division west, NYD-E New York division east, S/I signal interruption
02.04.22	Appendix C	All	Added 2022 Wilmington PD Office Seniority roster
12.23.21	Preface	9, 10, 11 14 16, 17 52	Amtrak Core Values & Safety Starts with me program Added New York- West division HQ in Trenton, NJ Updated Zones 1, 2/3, 4 & 8 geographical limits Added SCA- SCADA Operation category
11.08.21	FAR-2	1	Updated to include approved vacations of 5 or more consecutive working days which fall on a major holiday week are not eligible to be rescheduled
09.16.21	Appendix F	All	Removed Movement Office Dress Code policy

**SUMMARY OF CHANGES CONTINUED**

Date	Guideline	Page(s) Affected	Reason For Change
09.16.21	SCA-1	All	Issued <i>Applying & Removing Enhanced Employee Protection System (EEPS) tags</i>
10.01.20	FAR-5	All	Issued <i>Interpreting Planned Outage Application Form</i>
10.01.20	FAR-6	All	Issued <i>Maintaining Outage Scheduler</i>
02.17.20	SUB-1	All	Issued <i>Issuing & Releasing a (12 kV) Trolley Circuit Breaker Clearance</i>
02.17.20	FAR-4	All	Issued <i>Maintaining Clearance Form NEC.84</i>
11.01.19	Appendix D,E,F	All	Issued- (D) <i>National Attendance Policy</i> - (E) <i>Time Entrance Reporting Policy (TED)</i> - (F) <i>Movement Office Dress Code Policy</i>
05.08.19	FAR-3	All	Issued <i>Maintaining Out of Service Equipment Log</i>
05.08.19	STO-1, STO-2	2	Updated to include Out of Service Equipment.xls to 5.0 references
02.04.19	STO-1, STO-2	All	Updated Performing and Receiving Shift Turnover to reflect addition of Shift Turnover report, current operating reports
02.04.19	STO-3	All	Updated Definitions and References Added executing radio base transmission test Included review of active ET letters and memos
02.04.19	STO-4	All	Issued <i>Maintaining Shift Turnover Report</i>
02.04.19	Appendix C	All	Added 2019 Wilmington PD Office Seniority roster
01.01.19	PDE-1	All	Issued <i>Evacuating the Power Director Office</i>
01.01.19	PDE-2	All	Issued <i>Returning to the Power Director Office</i>
01.01.19	FAR-2	All	Issued <i>Requesting Vacation</i>
01.01.19	Appendix A	All	Updated <i>Glossary</i> to reflect new AMT-2 release on 01.01.19
07.23.18	Preface	10	Updated Organization Chart to reflect Power Director move to System Operations
04.19.17	FAR-1	All	Issued <i>Maintaining Power Director Logbook</i>
03.14.17	STO-1	All	Issued <i>Performing a Shift Turnover</i>
03.14.17	STO-2	All	Issued <i>Receiving a Shift Turnover</i>
03.14.17	STO-3	All	Issued <i>Performing a Review of Operating Zone</i>
03.14.17	Appendix B	All	Issued <i>Abbreviations & Acronyms</i>
01.30.17	Appendix A	All	Issued <i>Glossary</i>
01.20.17	Preface	All	Issued <i>Preface</i> for the Power Director Operating Guidelines

Amtrak's CNOC Building, as shown in Figure 1-1, is located at 15 South Poplar Street, southwest of the intersection of Poplar Street and Front Street in Wilmington, DE 19801. The two-story building is bordered to the south by the Christina River, to the west by a telecommunications relay station, to the east by a commercial / industrial complex and to the north by Amtrak's Wilmington Station. The building is located within a region targeted for selective historic, commercial, environmental, and economic revitalization by the Governor's Task Force on the future of the Brandywine and Christina Rivers.

The property was formerly part of the historic Pusey and Jones Shipyard. It previously occupied by several machine shops, forge shops and boiler shops related to the shipyard from approximately 1884 to 1936.

CNOC is the control center for Amtrak's operations across the country. Amtrak's Power Director Office is located on the first floor of the CNOC Building.



Figure 1-1. Amtrak's CNOC Building

Power Directors coordinate all activities related to the operation of Amtrak's 25 Hz electrification system between Philadelphia, PA and Washington, DC as well Amtrak's Keystone service from Philadelphia, PA to Harrisburg, PA. They perform a critical role in the Electric Traction Department for Amtrak. This office contains a control board that displays the condition of high voltage circuits and equipment relating to Amtrak's 1 ϕ , 12 kV, 25 Hz electrification system. This allows the Power Directors information to make adjustments based on constantly changing conditions. The functionality of this office is critical to the continued operation for electric train movement. This section will focus on the tasks that the Power Director performs when evacuation of the Power Director Office is required.

PDE-1 Evacuating the Power Director Office.

PDE-2 Returning to the Power Director Office.



PDE-1 EVACUATING THE POWER DIRECTOR OFFICE

1.0 TASK OBJECTIVE

Respond to an evacuation of the Power Director Office by gathering necessary information and notifying required personnel.

2.0 RECOMMENDED CONDITIONS

This task should be performed when the fire alarm sounds, or an evacuation of the Power Director Office is required.

3.0 REFERENCES

- Contact List
- Prints
- Power Director Clearance Form (NEC.84)
- Power Director Electrical Work Permit Form (NEC.85)
- Callout Sheets
- Amtrak Issued Cell Phone
- Appendix A. Glossary

4.0 POWER DIRECTOR ACTION

In the event the Power Director Office needs to be evacuated, the **Power Director**:

1. **Remains** calm.
2. **Writes** down time fire alarm sounded, or evacuation was announced.
3. **Stops** work safely.
4. **Maintains** situational awareness.
5. **Gathers** following items:
 - Contact list
 - Prints
 - Outstanding clearances and work permits
 - Callout sheets
 - Amtrak issued cell phone
6. **Logs** off computers.
7. **Leaves** Power Director Office by nearest or safest exit.
8. **Proceeds** to designated area.
9. **Stays** in designated emergency assembly point until instructed otherwise.



10. **Notifies** following that Power Director Office was evacuated:

- Load Dispatcher Office
- Electric Traction personnel on property

NOTE: Notifying appropriate personnel allows those individuals an opportunity to engage any mechanism required to ensure a proper response is initiated.

11. **Awaits** "all clear" and re-entry signal from designated Amtrak representative that it is OK to return to Power Director Office.

12. If all clear and re-entry signal is delayed:

12a. **Maintains** current appropriate evacuation safety procedures.

ATTENTION

Once the Power Director is in a safe environment, they can advise the field personnel of the Power Director's current situation and the Employee in Charge out in the field can determine if they can continue to work safely.



PDE-2 RETURNING TO THE POWER DIRECTOR OFFICE

1.0 TASK OBJECTIVE

Resume duties of the Power Director after returning to the Power Director Office.

2.0 RECOMMENDED CONDITIONS

This task should be performed when the Power Director has returned to the Power Director Office.

3.0 REFERENCES

- Contact List
- Prints
- Power Director Clearance Form (NEC.84)
- Power Director Electrical Work Permit Form (NEC.85)
- Callout Sheets
- Amtrak Issued Cell Phone
- SCADA Operating System
- Microsoft Outlook Mail
- ET Logbook.mdb
- Appendix A. Glossary
- Appendix B. Abbreviations & Acronyms

4.0 POWER DIRECTOR ACTION

After returning to the Power Director Office, the **Power Director**:

1. **Writes** down time Power Director has returned to office.
2. **Logs** back on computers.
3. **Reviews** and determines validity of alarms.
4. **Notifies** following that Power Director has returned to office:
 - Load Dispatcher Office
 - ET personnel on property
5. **Returns** following items to their proper place:
 - Clearances
 - Work permits
 - Contact list
 - Prints
 - Amtrak issued cell phone
 - Callout sheets



POWER DIRECTOR OPERATING GUIDELINES

PDE-2 Returning to the Power Director Office

Task Outline

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6. **Enters** time in Log Book that Power Director was absent from office.
7. **Sends** Email out with times Power Director was absent from office.



Power Directors are required to perform a Shift Turnover, ensuring a smooth transition from one Power Director shift to the next. A Shift Turnover is a transfer of responsibility and information regarding the status of the operating zone from the outgoing to incoming Power Director. A smooth transition from one Power Director to the next is essential to ensure continued, safe, and reliable operations.

The Shift Turnover involves a period of preparation by the outgoing Power Director. It must be valued by those in attendance. Information on a Shift Turnover would include but not limited to; any event in progress, outstanding clearances or work permits, equipment removed from or returned to service, changes in system configuration, scheduled work for the next tour of duty, personnel on property, signal power system set-up, and any unusual conditions including impending inclement weather. Key information needs to be specified and presented. Extra attention during a Shift Turnover is crucial when the incoming Power Director has returned following a lengthy absence from work or deviates from their normal tour of duty. A Shift Turnover is required to be both verbal and written.

The goal of a Shift Turnover is for the incoming Power Director to know as much about the status of the operating zone as the outgoing Power Director. This can only be accomplished with cooperation between both Power Directors. Two-way communication with feedback is essential at Shift Turnover with both Power Directors taking joint responsibility for ensuring accurate communication. This section will focus on the tasks that the Power Director performs related to Shift Turnover.

- STO-1 **Performing** a Shift Turnover.
- STO-2 **Receiving** a Shift Turnover.
- STO-3 **Performing** a Review of Operating Zone.
- STO-4 **Maintaining** Shift Turnover Report.

**STO-1 PERFORMING A SHIFT TURNOVER****1.0 INTRODUCTION**

The Wilmington Power Director Office is 24-hour 7 days a week operation covered in three shifts. At the end of each shift, the incoming Power Director assumes the shift from the outgoing Power Director. A smooth transition from one Power Director to the next is important to ensure continued, reliable operation of the Amtrak Electric Traction electrification system.

The goal of the outgoing Power Director is to help ensure that the incoming Power Director is properly informed with the status of the operating zone. This task focuses on the role of the outgoing Power Director during a Shift Turnover. Task STO-2 describes the role of the incoming Power Director.

2.0 TASK OBJECTIVE

Ensure incoming Power Director is adequately briefed on current system conditions including changes in system configuration, equipment that was removed from or returned to service, outstanding clearances or work permits, and location of field forces. This will ensure a smooth transition from one Power Director to the next.

3.0 RECOMMENDED CONDITIONS

This task should be performed at the end of every shift, when the relief for the next shift is physically present and ready to assume the duties of the Power Director.

4.0 REFERENCES

- Shift Turnover Report.doc
- ET Logbook.mdb
- Power Director Office Schedule.xls
- Power Director Clearance Form (NEC.84)
- Power Director Electrical Work Permit Form (NEC.85)
- Out of Service Equipment.xls
- Track Usage Report
- SCADA Operating System
- Microsoft Outlook Mail
- Outage Scheduler in Microsoft Outlook Calendar
- ET Letters, Memos, and Standard Operating Instructions
- Appendix A. Glossary
- Appendix B. Abbreviations & Acronyms



5.0 POWER DIRECTOR ACTION

With the incoming Power Director for the next shift physically present and ready to assume the duties of the Power Director, the outgoing **Power Director**:

1. **Presents** Shift Turnover report to incoming Power Director.
2. **Explains** status of outstanding clearances or work permits.
3. **Reviews** plate orders in effect.
4. **Describes** current events in progress.
5. **Describes** changes in system configuration.
6. **Reviews** signal power line set-up.
7. **Adds** equipment removed or returned to service within last 72 hours.
8. **Names** ET personnel on property.
9. **Reviews** upcoming major scheduled outages
10. **Describes** any anticipated event. (Personnel expected on property, planned signal power interruptions, etc.)
11. **Reviews** active ET letters including memos or SOIs.
12. **Discusses** general information relating to Power Director Office.
13. **Informs** incoming Power Director of impending inclement weather.
14. **Identifies** mark-offs by field personnel.
15. **Provides** incoming Power Director with necessary resources including:
 - Shift Turnover Report.doc
 - Power Director Office Schedule.xls
 - ET Logbook.mdb
 - Issued or Pending Clearances and Work Permits
 - Out of Service Equipment.xls
 - Microsoft Outlook Mail
 - Track Usage Report
 - Outage Scheduler in Microsoft Outlook Calendar
 - SCADA Operating System
 - ET Letters, Memos and Standard Operating Instructions
16. **Answers** questions presented by incoming Power Director.

**STO-2 RECEIVING A SHIFT TURNOVER****1.0 INTRODUCTION**

The Wilmington Power Director Office is 24-hour 7 days a week operation covered in three shifts. At the end of each shift, the incoming Power Director assumes the shift from the outgoing Power Director. A smooth transition from one Power Director to the next is important to ensure continued, reliable operation of the Amtrak Electric Traction electrification system. The goal of a Shift Turnover is for the incoming Power Director to know as much about the status of the operating zone as the outgoing Power Director. This can only be accomplished with cooperation between both Power Directors.

The goal of the incoming Power Director is to learn the status of the operating zone and become as familiar with this status as the outgoing Power Director. This task focuses on the role of the incoming Power Director during a Shift Turnover. STO-1 described the role of the outgoing Power Director.

2.0 TASK OBJECTIVE

Become adequately briefed on system conditions including changes in system configuration, equipment that was removed from or returned to service, outstanding clearances or work permits, signal power line set-up and location of field forces. This will ensure a smooth transition from one Power Director to the next.

3.0 RECOMMENDED CONDITIONS

This task should be performed at the beginning of every shift, prior to assuming the responsibilities of the Power Director.

4.0 REFERENCES

- Shift Turnover Report.doc
- ET Logbook.mdb
- Power Director Office Schedule.xls
- Power Director Clearance Form (NEC.84)
- Power Director Electrical Work Permit Form (NEC.85)
- Out of Service Equipment.xls
- Track Usage Report
- SCADA Operating System
- Microsoft Outlook Mail
- Outage Scheduler in Microsoft Outlook Calendar
- ET Letters, Memos, and Standard Operating Instructions
- Appendix A. Glossary
- Appendix B. Abbreviations & Acronyms



5.0 POWER DIRECTOR ACTION

Before assuming the duties and responsibilities of the Power Director, the incoming **Power Director**:

1. **Receives** Shift Turnover report from outgoing Power Director.
2. **Requests** outgoing Power Director for any clarification of current system conditions, including:
 - Current events in progress
 - Changes in system configuration
 - Equipment removed or returned to service since incoming Power Director's last shift
 - System outages or issues over last 24-48 hours
 - Status of outstanding clearances or work permits
 - Plate orders in effect
 - Signal power line set-up
 - Personnel currently on property
 - Mark-offs by field personnel
 - Scheduled outages
 - Upcoming events
 - Inclement weather predicted
3. **Accepts** Shift Turnover from outgoing Power Director.

ATTENTION

Ask necessary questions of outgoing Power Director to ensure a complete understanding of current system conditions for the Operating Zone.



STO-3 PERFORMING A REVIEW OF OPERATING ZONE

1.0 TASK OBJECTIVE

To accurately verify information within your assigned operating zone and become aware of any abnormal conditions to ensure continued safety, reliability, and operation of the system.

2.0 RECOMMENDED CONDITIONS

This task should be performed at the beginning of every shift, after accepting the Shift Turnover from the outgoing Power Director.

3.0 REFERENCES

- Shift Turnover Report.doc
- ET Logbook.mdb
- Power Director Clearance Form (NEC.84)
- Power Director Electrical Work Permit Form (NEC.85)
- Out of Service Equipment.xls
- Track Usage Report
- SCADA Operating System
- Microsoft Outlook Mail
- Outage Scheduler in Microsoft Outlook Calendar
- STO-4 Maintaining Shift Turnover Report
- ET Letters, Memos, and Standard Operating Instructions
- Appendix A. Glossary
- Appendix B. Abbreviations & Acronyms

4.0 POWER DIRECTOR ACTION

After accepting a Shift Turnover, the **Power Director**:

1. **Reads** ET Logbook.
2. **Reviews** following for accuracy:
 - Shift Turnover report
 - Outstanding clearances and work permits (issued and pending)
 - Tag list
 - Plate orders in effect
 - Out of service equipment log
 - Inhibited alarm summary
3. **Surveys** following for accuracy:
 - Transmission line
 - Catenary
 - Substation equipment



- Signal power line set-up
 - RTU status (substation and interlocking)
4. **Performs** following meter readings on Shift Turnover report:
 - Control battery voltage
 - Signal machine amperage and voltage (abnormal fluctuations)
 5. **Checks** following metering equipment for accuracy:
 - Bus voltages
 - 25 Hz battery chargers
 - 60 Hz battery chargers
 - Transformer amperage (abnormal fluctuations)
 6. **Verifies** radio bases for operating zone are selected for monitoring.
 7. **Executes** a radio base transmission test.
 8. If no reply is received:
 - 8a. **Documents** time and location radio base tested in Logbook.
 9. **Reviews** active ET Letters and Memos.
 10. **Reviews** following items in Outage Scheduler:
 - Scheduled outages on your shift.
 - Scheduled outages for incoming Power Director.
 11. **Reviews** Track Usage sheet.
 12. **Reads** Email for information pertaining to your operating zone.

ATTENTION

When reviewing the Outage Scheduler, pay close attention to scheduled work involving signal line.



STO-4 MAINTAINING SHIFT TURNOVER REPORT

1.0 INTRODUCTION

The Shift Turnover report involves a period of preparation by the outgoing Power Director. Information on a Shift Turnover report would include but not limited to; any event in progress, outstanding clearances or work permits, equipment removed from or returned to service, changes in system configuration, scheduled work for the next tour of duty, personnel on property, signal power system set-up, meter readings, and any unusual conditions including impending inclement weather. Key information needs to be specified and presented. A Shift Turnover is required to be both verbal and written. Figure STO 4-1 shows a blank Shift Turnover report.

The goal of a Shift Turnover is for the incoming Power Director to know as much about the status of the operating zone as the outgoing Power Director. This can only be accomplished with cooperation between both Power Directors. Two-way communication with feedback is essential at Shift Turnover with both Power Directors taking joint responsibility for ensuring accurate communication. Figure STO 4-2 shows a properly filled out Shift Turnover report.

2.0 TASK OBJECTIVE

Enter all appropriate information into the Shift Turnover report to ensure a complete and accurate record of the system is maintained.

3.0 RECOMMENDED CONDITIONS

This task should be performed during every shift, when there is a change in status to the operating zone or information becomes available.

4.0 REFERENCES

- Shift Turnover Report.doc
- ET Logbook.mdb
- Power Director Office Schedule.xls
- STO-3 Performing a Review of Operating Zone
- Out of Service Equipment.xls
- Power Director Clearance Form (NEC.84)
- Power Director Electrical Work Permit Form (NEC.85)
- Track Usage Report
- SCADA Operating System
- Microsoft Outlook Mail
- Outage Scheduler in Microsoft Outlook Calendar
- ET Letters, Memos and Standard Operating Instructions
- Appendix A. Glossary
- Appendix B. Abbreviations & Acronyms



POWER DIRECTOR OPERATING GUIDELINES

STO-4 Maintaining Shift Turnover Report

Task Outline

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POWER DIRECTOR SHIFT TURNOVER REPORT

ZONE 4

Day: Choose a day. Date: 1/6/2019 Shift: Choose an item.

Outgoing Power Director: Choose a name. Incoming Power Director: Choose a name.

OUTSTANDING CLEARANCES

- ☐ ☐

CURRENT EVENTS IN PROGRESS

- ☐ ☐

CHANGES IN SYSTEM CONFIGURATION

- ☐ ☐

SIGNAL SET-UP

- ☐ ☐

EQUIPMENT REMOVED FROM SERVICE LAST 72 HOURS

- ☐ ☐

EQUIPMENT RETURNED TO SERVICE LAST 72 HOURS

- ☐ ☐

ET PERSONNEL ON PROPERTY

- ☐ ☐

MAJOR SCHEDULED OUTAGES FOR NEXT SHIFT

- ☐ ☐

UPCOMING EVENTS

- ☐ ☐

ACTIVE ET LETTERS, MEMOS

- ☐ ☐

GENERAL INFORMATION

- ☐ ☐

INCLEMENT WEATHER CONDITIONS

- ☐ ☐

METER READINGS

CONTROL VOLTS				CONTROL VOLTS				SIGNAL READINGS						
SUB NO.	7AM	3PM	11PM	SUB NO.	7AM	3PM	11PM	SUB NO.	7AM		3PM		11PM	
									VOLTS	AMPS	VOLTS	AMPS	VOLTS	AMPS
<u>1A</u>				<u>03</u>				<u>1A-A</u>						
<u>2A</u>				<u>04</u>				<u>1A-B</u>						
<u>09</u>								<u>2A</u>						
<u>30</u>								<u>09</u>						
								<u>03</u>						

Figure STO 4-1. Blank Shift Turnover Report



5.0 POWER DIRECTOR ACTION

To enter information into the Shift Turnover report, the **Power Director**:

1. **Opens** Shift Turnover report.doc
2. **Selects** "Day" of report.

AMTRAK
POWER DIRECTOR SHIFT TURNOVER REPORT
ZONE 4

Day:	Choose a day.	Date:	1/6/2019	Shift:	Choose an item.
Outgoing Power	Monday	Choose a name.	Incoming Power Director:	Choose a name.	
	Tuesday				
OUTSTANDING	Wednesday				
	Thursday				
	Friday				
	Saturday				
	Sunday				
CURRENT EVENTS IN PROGRESS					

3. **Selects** "Date" of report.

AMTRAK
POWER DIRECTOR SHIFT TURNOVER REPORT
ZONE 4

Day:	Choose a day.	Date:	1/6/2019	Shift:	Choose an item.
Outgoing Power Director:	Choose a name.	Incoming Power Director:	Choose a name.		
OUTSTANDING CLEARANCES					
CURRENT EVENTS IN PROGRESS					



POWER DIRECTOR OPERATING GUIDELINES

STO-4 Maintaining Shift Turnover Report

25-FOI-00546

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4. Selects "Shift" of report.

AMTRAK

POWER DIRECTOR SHIFT TURNOVER REPORT

ZONE 4

Day: Choose a day. Date: 1/6/2019 Shift: Choose an item.

Outgoing Power Director: Choose a name. Incoming Power Director: Choose an item.

OUTSTANDING CLEARANCES

CURRENT EVENTS IN PROGRESS

7am - 3pm
3pm - 11pm
11pm - 7am

5. Selects names of following:

- Outgoing Power Director
- Incoming Power Director

AMTRAK

POWER DIRECTOR SHIFT TURNOVER REPORT

ZONE 4

Day: Choose a day. Date: 1/6/2019 Shift: Choose an item.

Outgoing Power Director: Choose a name. Incoming Power Director: Choose a name.

OUTSTANDING CLEARANCES

CURRENT EVENTS IN PROGRESS

Hutchinson, R.L.
McArdle, P.J.
Archdeacon, M.
Harris, A.S.
Walker, A.
Donmoyer, B.K.
Strange, I.
Polk, C.
Cooper, R.
McClintock, C.
Serino, F.

AMTRAK

POWER DIRECTOR SHIFT TURNOVER REPORT

ZONE 4

Day: Choose a day. Date: 1/6/2019 Shift: Choose an item.

Outgoing Power Director: Choose a name. Incoming Power Director: Choose a name.

OUTSTANDING CLEARANCES

CURRENT EVENTS IN PROGRESS

Hutchinson, R.L.
McArdle, P.J.
Archdeacon, M.
Harris, A.S.
Walker, A.
Donmoyer, B.K.
Strange, I.
Polk, C.
Cooper, R.
McClintock, C.



6. **Lists** all outstanding clearances or work permits.

OUTSTANDING CLEARANCES

- #3821- 1X Trolley 0
- #4002- 1ED/ 164 (138 kV) Transmission Line 0
- #4023- #5 SFC at Richmond 0

7. **Describes** any current event in progress.

- Include plate orders in effect not linked with a clearance.

CURRENT EVENTS IN PROGRESS

- All open Sig Brks locked-out due to impending storm
- To remove power in PCY, you must protect with master plates: ET Memo PHL-22709- SPNX-1, NPESPN11 w/ CETC 5, 1X, MCS, 106CN, 106E, 106Q, plates must be in effect with Race St. and notify Train Master
- Snow Plan B in effect
- Plate 501 in effect for Septa PD

8. **Notes** any changes in system configuration.

CHANGES IN SYSTEM CONFIGURATION

- R1 & R2 trolleys tied together (4S switch closed at Penn)
- 1003 & R4 trolleys tied together (6S switch closed at Penn)
- 1X & 361 trolleys tied together (11S switch closed at Penn)

9. **Enters** status of each device for signal power line set-up.

- Include relevant notes pertaining to device.

SIGNAL POWER LINE SET-UP

Loc.	Device	Status	Notes	Loc.	Device	Status	Notes
<u>30</u>	352	L/O	Talk to NYPD before operation.	<u>04</u>	352	OPEN	Talk to Zone 8 PD before operation.
<u>06</u>	252C	L/O	Talk to Septa PD before operation.	<u>1A</u>	252A	CLOSED	
<u>09</u>	252A	OPEN		<u>1A</u>	252B	OOS	
<u>09</u>	252E	OOS	No longer in use.	<u>1A</u>	252C	CLOSED	
<u>09</u>	252B	CLOSED		<u>1A</u>	A MACHINE	FEEDING	
<u>09</u>	252Z	L/O		<u>1A</u>	B MACHINE	OOS	
<u>09</u>	A MACHINE	FEEDING		<u>2A</u>	252A	OPEN	



10. **Adds** equipment removed from or returned to service within last 72 hours.

EQUIPMENT REMOVED FROM SERVICE LAST 72 HOURS

- | | |
|-----------------------|---|
| ○ PA4 switch at Paoli | ○ 10S switch at Penn (DC removed, manual oper only) |
|-----------------------|---|

EQUIPMENT RETURNED TO SERVICE LAST 72 HOURS

- | | |
|-----------------|---|
| ○ 1 XFMR at S30 | ○ |
|-----------------|---|

11. **Names** ET personnel on property.

ET PERSONNEL ON PROPERTY

- | | |
|--------------------------------------|---|
| ○ B.Blackwell 3p-11pm Storm Stand-by | ○ R.Grober and C.Tucker 3p-11p Storm Stand-by |
|--------------------------------------|---|

12. **Enters** upcoming major scheduled outages.

MAJOR SCHEDULED OUTAGES FOR NEXT SHIFT

- | | |
|---|---|
| ○ 19 & 29 Transmission Lines, 900 trolleys, signal line | ○ |
| ○ PECO wire crossing 2am start- Split Phase condition | ○ |

13. **Describes** any anticipated events.

UPCOMING EVENTS

- | | |
|--|---|
| ○ Peco outage 8p-6a on 11/30. Get Sub 03 Sig Machine on stand-by | ○ |
|--|---|

14. **Adds** active ET letters.

- Include relevant SOIs or Office memos.

ACTIVE ET LETTERS, MEMOS

- | | |
|---|---------------------------------|
| ○ ET-SYS-003-18-SOI 211 updated | ○ ARINC Switching memo 11.21.18 |
| ○ ETMEMO-05-FY19- HTR 2 & HTR 3 at Holmes | ○ ET MEMO PHL- 22709 |
| ○ ETMEMO-06-FY19- HTR 1 & HTR 3 at Paoli | ○ |



15. **Includes** general information relating to Operating Zone.

- System outages or issues over last 72 hours can be included in this section.

GENERAL INFORMATION

- D.Moore Vac 11.24 to 12.2 (contact V.Khatchadourian for all issues)
- Sub 1A W.Phila B side of RTU OOS (Only A side working)
- Cat Car #123456 OOS
- Door Entry Alarm is broke at Sub 04 Paoli & Sub 09 Zoo

16. **Notes** impending inclement weather.

INCLEMENT WEATHER CONDITIONS

- Storm warning in Philadelphia until 7pm- high winds
-

17. **Enters** following Meter Readings:

- Control voltage
- Signal machine voltage
- Signal machine amperage

METER READINGS													
CONTROL VOLTS				CONTROL VOLTS				SIGNAL READINGS					
SUB NO.	7AM	3PM	11PM	SUB NO.	7AM	3PM	11PM	SUB NO.	7AM	3PM	11PM	SUB NO.	11PM
									VOLTS	AMPS	VOLTS	AMPS	
<u>1A</u>	131			<u>03</u>	136			<u>1A-A</u>	482	39			
<u>2A</u>	132			<u>04</u>	132			<u>1A-B</u>	OFF	OFF			
<u>09</u>	133							<u>2A</u>	475	37			
<u>30</u>	136							<u>09</u>	478	35			
								<u>03</u>	476	38			

18. **Reviews** Shift Turnover report for accuracy.

19. **Sends** Email of Shift Turnover report to proper distribution list.

ATTENTION

Meter Readings are to be taken after a Shift Turnover has been completed as part of STO-3 Performing a Review of Operating Zone.



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STO-4 Maintaining Shift Turnover Report

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POWER DIRECTOR SHIFT TURNOVER REPORT

ZONE 4

Day: Monday Date: 1/6/2019 Shift: 7am - 3pm

Outgoing Power Director: Harris, A.S. Incoming Power Director: Hutchinson, R.L.

OUTSTANDING CLEARANCES

- #3821- 1X Trolley ○
- #4002- 1ED/ 164 (138 kV) Transmission Line ○
- #4023- #5 SFC at Richmond ○

CURRENT EVENTS IN PROGRESS

- All open Sig Brks locked-out due to impending storm
- To remove power in PCY, you must protect with master plates: ET Memo PHL-22709- SPNX-1, NPESPN11 w/ CETC 5, 1X, MCS, 106CN, 106E, 106Q, plates must be in effect with Race St. and notify Train Master
- Snow Plan B in effect
- Plate 501 in effect for Septa PD

CHANGES IN SYSTEM CONFIGURATION

- R1 & R2 trolleys tied together (4S switch closed at Penn)
- 1003 & R4 trolleys tied together (6S switch closed at Penn)
- 1X & 361 trolleys tied together (11S switch closed at Penn)

SIGNAL POWER LINE SET-UP

Loc.	Device	Status	Notes	Loc.	Device	Status	Notes
<u>30</u>	352	[L/O]	[Talk to NYPD before operation.]	<u>04</u>	352	[OPEN]	[Talk to Zone 8 PD before operation.]
<u>06</u>	252C	[L/O]	[Talk to Septa PD before operation.]	<u>1A</u>	252A	[CLOSED]	□
<u>09</u>	252A	[OPEN]	□	<u>1A</u>	252B	[OOS]	□
<u>09</u>	252E	[OOS]	[No longer in use.]	<u>1A</u>	252C	[CLOSED]	□
<u>09</u>	252B	[CLOSED]	□	<u>1A</u>	A MACHINE	[FEEDING]	□
<u>09</u>	252Z	[L/O]	□	<u>1A</u>	B MACHINE	[OOS]	□
<u>09</u>	A MACHINE	[FEEDING]	□	<u>2A</u>	252A	[OPEN]	□

EQUIPMENT REMOVED FROM SERVICE LAST 72 HOURS

- PA4 switch at Paoli
- 10S switch at Penn (DC removed, manual oper only)

EQUIPMENT RETURNED TO SERVICE LAST 72 HOURS

- 1 XFMR at S30 ○

ET PERSONNEL ON PROPERTY

- B.Blackwell 3p-11pm Storm Stand-by
- R.Grober and C.Tucker 3p-11p Storm Stand-by

MAJOR SCHEDULED OUTAGES FOR NEXT SHIFT

- 19 & 29 Transmission Lines, 900 trolleys, signal line ○
- PECO wire crossing 2am start- Split Phase condition ○

UPCOMING EVENTS

- Peco outage 8p-6a on 11/30. Get Sub 03 Sig Machine on stand-by ○

ACTIVE ET LETTERS, MEMOS

- ET-SYS-003-18-SOI 211 updated
- ARINC Switching memo 11.21.18
- ETMEMO-05-FY19- HTR 2 & HTR 3 at Holmes
- ET MEMO PHL- 22709
- ETMEMO-06-FY19- HTR 1 & HTR 3 at Paoli

GENERAL INFORMATION

- D.Moore Vac 11.24 to 12.2 (contact V.Khatchadourian for all issues)
- Cat Car # 123456 OOS
- Sub 1A W.Phila B side of RTU OOS (Only A side working)
- Door Entry Alarm is broke at Sub 04 Paoli & Sub 09 Zoo

INCLEMENT WEATHER CONDITIONS

- Storm warning in Philadelphia until 7pm- high winds ○



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STO-4 Maintaining Shift Turnover Report

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METER READINGS														
CONTROL VOLTS				CONTROL VOLTS			SIGNAL READINGS							
SUB NO.	7AM	3PM	11PM	SUB NO.	7AM	3PM	11PM	SUB NO.	7AM		3PM		11PM	
									VOLTS	AMPS	VOLTS	AMPS	VOLTS	AMPS
<u>1A</u>	131			<u>03</u>	136			<u>1A-A</u>	482	39				
<u>2A</u>	132			<u>04</u>	132			<u>1A-B</u>	OFF	OFF				
<u>09</u>	133							<u>2A</u>	475	37				
<u>30</u>	136							<u>09</u>	478	35				
								<u>03</u>	476	38				

Figure STO 4-2. Completed Shift Turnover Report



There are several forms and reports that the Power Director must maintain and interpret daily. The ability to correctly maintain and understand these documents is essential to proper system operation and documentation. In addition, they are required to disseminate that information (personnel whose area of responsibility is directly affected by an outage or incident) contained in those documents throughout the system as applicable. The maintenance of most of the forms and reporting requirements covered in this section are essential steps in many of the other tasks described in this manual. The tasks included in this section are:

- FAR-1 **Maintaining** Electric Traction Logbook.
- FAR-2 **Requesting** Vacation.
- FAR-3 **Maintaining** Out of Service Equipment Log.
- FAR-4 **Maintaining** Clearance Form NEC.84.
- FAR-5 **Interpreting** Planned Outage Application Form.
- FAR-6 **Maintaining** Outage Scheduler.
- FAR-7 **Performing** a Power Director Callout.
- FAR-8 **Performing** a Field Personnel Callout.
- FAR-9 **Maintaining** Electrical Work Permit Form NEC.85.

**FAR-1 MAINTAINING ELECTRIC TRACTION LOGBOOK****1.0 INTRODUCTION**

The Power Director on duty is responsible to identify all system disturbances and occurrences on the Amtrak electrification system. This includes routine actions, such as mark-offs, equipment that was removed or returned to service etc. as well as unusual actions and events, such as trippings, AMT.2 rules violations, equipment, computer or communication failure etc., actions that were taken and who was notified. The Electric Traction Logbook is the tool used to document such events; it is therefore important that this log be maintained properly. Proper log entries ensure that past events can be easily researched.

All system disturbances and occurrences must be recorded and analyzed to ensure the interconnected system responded appropriately and ensure the continuous reliability of Amtrak's electrification system. The following information should be included but not limited to when logging an event;

- Locations
- Alarms received
- Times and correct sequence of equipment that tripped
- Action taken
- Times equipment was re-closed
- AC holds in place
- Equipment left out of service
- Relay targets
- Weather conditions at time of event
- Who was notified
- Root cause (factor that caused event). Do not surmise or guess

2.0 TASK OBJECTIVE

Enter all appropriate data into the Power Director Logbook to ensure a complete and accurate record is maintained of all system disturbances or occurrences within the operating zone.

3.0 RECOMMENDED CONDITIONS

This task should be performed as soon as possible after a system disturbance or occurrence takes place to ensure all the details of the event can be accurately recalled and recorded.

4.0 REFERENCES

- ET Logbook.mdb
- AMT.2 Electrical Operating Rules & Instructions
- SCADA Operating System
- Microsoft Outlook Mail
- Appendix A. Glossary
- Appendix B. Abbreviations & Acronyms



5.0 POWER DIRECTOR ACTION

To log a system disturbance or occurrence, the **Power Director**:

1. **Opens** Electric Traction Logbook.mdb
2. **Selects** "Logbook New Entry".





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FAR-1 Maintaining Electric Traction Logbook

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3. Selects "Date" event occurred.

- Clicking on calendar icon under *Time* brings up window for date to be selected.
- Adding a date automatically populates a *Log Index* number.



NEW LOG ENTRY



This form is to be used for entry of new data into the log book.

Index	Date	Time	Circuit, Apparatus, or Event	Type of Event
(New)				

Division: Zone: Location: Secondary Location:

Category: Root Cause: Extended Root Cause:

System Disturbance: Personnel Notified of Event:

Time / Date Returned to Normal:

Listed are some shortcuts & hints which you may find useful in navigating fields.

1. <CTRL> <S> inserts the system date into the field.
2. <CTRL> <ENTER> Moves the cursor down to a new line when entering data in the "Disturbance or Occurrence" fields.

Last Updated:

Select Group to Email:

ABC

Send Email OR Place Time Stamp

When all new information has been added to the log item, click either 'Send Email' or 'Place Time Stamp' to



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4. Records "Time" of event.



NEW LOG ENTRY



This form is to be used for entry of new data into the log book.

Index	Date	Time	Circuit, Apparatus, or Event	Type of Event
1510	Thursday, November 30, 201	1:28 PM		

Division Sub-Divisions Zone Location: Secondary Location:

Category Root Cause Extended Root Cause

System Disturbance or Occurrence Personnel Notified of Event

Time / Date Returned to Normal

Listed are some shortcuts & hints which you may find useful in navigating

1. <CTRL> .<> inserts the system date into the field.
2. <CTRL> <ENTER> Moves the cursor down to a new line when entering data in the "Disturbance or Occurrence" fields.

Last Updated

Select Group to Email

Send Email OR Place Time Stamp

When all new information has been added to the log item, click either 'Send Email' or 'Place Time Stamp' to



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5. Lists "Circuits or Apparatus" affected.

- If no circuit or apparatus are affected. Provide brief description of event.



NEW LOG ENTRY



This form is to be used for entry of new data into the log book.

Index	Date	Time	Circuit, Apparatus, or Event	Type of Event
1510	Thursday, November 30, 2017	1:28 PM	#11 12Kv Bus	

Division	Sub-Divisions	Zone	Location:	Secondary Location:

Category	Root Cause	Extended Root Cause

System Disturbance or Occurrence	Personnel Notified of Event

Time / Date Returned to Normal

☐ Log Complete

Listed are some shortcuts & hints which you may find useful in navigating into the field.

1. <CTRL> <.> inserts the system date into the field.
2. <CTRL> <ENTER> Moves the cursor down to a new line when entering data in the "Disturbance or Occurrence" fields.

Last Updated

Select Group to Email

Send Email OR Place Time Stamp

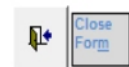
When all new information has been added to the log item, click either 'Send Email' or 'Place Time Stamp' to



6. Identifies "Type of Event".



NEW LOG ENTRY



This form is to be used for entry of new data into the log book.

Index	Date	Time	Circuit, Apparatus, or Event	Type of Event
1510	Thursday, November 30, 2017	1:28 PM	#11 12Kv Bus	

Division	Sub-Divisions	Zone	Location:

Category	Root Cause	Extended Root Cause

System Disturbance or Occurrence

3rd Rail
ABS
Breaker
Bus
Cable
Communication
Disconnect Switch
Feeder
Generation
HTR Station
NPO
Sect. Switch
Signal Sys
Transmission
Trolley
XFMR

3rd Rail Event
Air Break Switch Event
Circuit Breaker Event
Bus Section Event
Cable Event
Communication Event
Disconnect Switch Event
25 Hz or 60 Hz Feeder Event
Converter Station_SUY Event
Heater Station Event
No Power Outage
Sectionalizing Switch Event
Signal System Event
Transmission Line Event
Trolley Event
Transformer Event

check if log entry is completed

Listed are some shortcuts & hints which you may find useful in navigating

1. <CTRL>_<> inserts the system date into the field.
2. <CTRL> <ENTER> Moves the cursor down to a new line when entering data in the "Disturbance or Occurrence"

Select Group to Email

Send Email OR Place Time Stamp

Last Updated

When all new information has been added to the log item, click either 'Send Email' or 'Place Time Stamp' to



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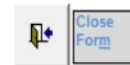
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Task Outline

7. **Notes** "Division" where event occurred.



NEW LOG ENTRY



This form is to be used for entry of new data into the log book.

Index	Date	Time	Circuit, Apparatus, or Event	Type of Event
1510	Thursday, November 30, 2017	1:28 PM	#11 12Kv Bus	Bus

Division	Sub-Divisions	Zone	Location:	Secondary Location:
MAD-N				
MAD-S				
NYD				
NED				

Root Cause	Extended Root Cause

System Disturbance or Occurrence	Personnel Notified of Event

Time / Date Returned to Normal

Log Complete ☐

check if log entry is completed

Listed are some shortcuts & hints which you may find useful in navigating

1. <CTRL> _<S> inserts the system date into the field.
2. <CTRL> <ENTER> Moves the cursor down to a new line when entering data in the "Disturbance or Occurrence"

Select Group to Email

Send Email OR Place Time Stamp

When all new information has been added to the log item, click either 'Send Email' or 'Place Time Stamp' to



POWER DIRECTOR OPERATING GUIDELINES

FAR-1 Maintaining Electric Traction Logbook

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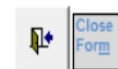
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8. Adds "Sub-Division" where event occurred.



NEW LOG ENTRY



This form is to be used for entry of new data into the log book.

Index	Date	Time	Circuit, Apparatus, or Event	Type of Event
1510	Thursday, November 30, 2017	1:28 PM	#11 12Kv Bus	Bus

Division	Sub-Divisions	Zone	Location:	Secondary Location:
MAD-N	Subdivision Harrisburg Lancaster Philadelphia Wilmington SEPTA Description MP 66.35 to State MP 66.35 to MP 21.3 Paoli MP 76 to 6.3 Darby to MP 21.3 Paoli MP 6.3 Darby to MP 29.3 Ragan SEPTA			

Category	System Disturbance or Occurrence	Personnel Notified of Event

Time / Date Returned to Normal

Log Complete ☐

check if log entry is completed

Listed are some shortcuts & hints which you may find useful in navigating
1. <CTRL> ,<> inserts the system date into the field.
2. <CTRL> <ENTER> Moves the cursor down to a new line when entering data in the "Disturbance or Occurrence"

Select Group to Email

ABC ✓

Send Email OR Place Time Stamp

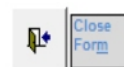
When all new information has been added to the log item, click either 'Send Email' or 'Place Time Stamp' to



9. Enters "Zone" where event occurred.



NEW LOG ENTRY



This form is to be used for entry of new data into the log book.

Index	Date	Time	Circuit, Apparatus, or Event	Type of Event
1510	Thursday, November 30, 2017	1:28 PM	#11 12Kv Bus	Bus

Division	Sub-Divisions	Zone	Location:	Secondary Location:
MAD-N	Wilmington	LD Zone 01 Zone 2/3 Zone 4 Zone 5 Zone 6 Zone 8 Zone 10		

Category	Root Cause	Extended Root Cause

System Disturbance or Occurrence	Personnel Notified of Event

Time / Date Returned to Normal

Log Complete
☐

check if log entry is completed

Listed are some shortcuts & hints which you may find useful in navigating

1. <CTRL>_<S> inserts the system date into the field.
2. <CTRL> <ENTER> Moves the cursor down to a new line when entering data in the "Disturbance or Occurrence"

Select Group to Email

Send Email	OR	Place Time Stamp

When all new information has been added to the log item, click either 'Send Email' or 'Place Time Stamp' to

Last Updated



10. **Enters** "Location" of event.
11. If event has a Secondary Location:
 - 11a. **Adds** "Secondary Location".



NEW LOG ENTRY



This form is to be used for entry of new data into the log book.

Index	Date	Time	Circuit, Apparatus, or Event	Type of Event
1510	Thursday, November 30, 2017	1:28 PM	#11 12Kv Bus	Bus

Division	Sub-Divisions	Zone	Location:	Secondary Location:
MAD-N	Wilmington	Zone 5	OTHER Sub 3 Bryn Mawr Sub 4 Paoli Sub 6 North Philadelphia Sub 10A Brill Sub 10 Glenolden Sub 11 Lamokin Sub 12 Bellevue Sub 13 West Yard Sub 30 Frankford Jct Safe Harbor Sub 64 Frazer Sub 65 Thorndale Sub 66 Parksburg Sub 67 Kinzer Sub 68 Witmar	

Category	Root Cause

System Disturbance or Occurrence	Personnel Notified of Event

Time / Date Returned to Normal

Log Complete
☐

check if log entry is completed

listed are some shortcuts & hints which you may find useful in navigating

1. <CTRL> .<> inserts the system date into the field.
2. <CTRL> <ENTER> Moves the cursor down to a new line when entering data in the "Disturbance or Occurrence"

Last Updated

Select Group to Email

ABC ✓

Send Email

OR

Place Time Stamp

When all new information has been added to the log item, click either 'Send Email' or 'Place Time Stamp' to



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Task Outline

12. **Identifies** "Category" of event. Do not surmise or guess.



NEW LOG ENTRY



This form is to be used for entry of new data into the log book.

Index	Date	Time	Circuit, Apparatus, or Event	Type of Event
1510	Thursday, November 30, 2017	1:28 PM	#11 12Kv Bus	Bus

Division	Sub-Divisions	Zone	Location:	Secondary Location:
MAD-N	Wilmington	Zone 5	Sub 11 Lamokin	

Category	Root Cause	Extended Root Cause
Accident/Incident	Non ET related Incident, Human Contact, etc.	
Accident/Incident-ET	ET Accident or Incident	
Animal	Animal Causing Outage	
Comm	Communication Outage or Event	
Debris	Debris in Catenary, Sig Line, 3rd Rail etc...	
Equipment	Traction Equipment Causing Outage or Event	
Fatigue/Hardware	Catenary, Sig Line, Transm, 3rd Rail Hardware	
FC Station	Converter Station or SUY Event	
NC	No Cause	
Overload	Circuit Overload	
PD Office Info	Office Information. Signal Set-Up, Mark-Offs etc.	
Procedure	Non ET Related Procedural Error. Buffer Zone etc	
Procedure-ET	ET Procedural Error. AMT II Violation etc...	
Substation	Outage or Event in Substation. ABS, XFMR, etc...	
Vegetation	Vegetation Causing Outage or Event	
Weather	Weather Related Outage or Event	

Personnel Notified of Event

Time / Date Returned to Normal

Log Complete ☐

check if log entry is completed

Listed are some shortcuts & hints which you may find useful in navigating

1. <CTRL> ; < > inserts the system date into the field.
2. <CTRL> <ENTER> Moves the cursor down to a new line when entering data in the "Disturbance or Occurance"

Last Updated

Select Group to Email

Send Email OR Place Time Stamp

When all new information has been added to the log item, click either 'Send Email' or 'Place Time Stamp' to



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13. If Root Cause is known:

13a. **Enters** "Root Cause" (factor that caused event).

- "Extended Root Cause" is a free text box to add additional info if needed.



NEW LOG ENTRY



This form is to be used for entry of new data into the log book.

Index	Date	Time	Circuit, Apparatus, or Event	Type of Event
1510	Thursday, November 30, 2017	1:28 PM	#11 12Kv Bus	Bus

Division	Sub-Divisions	Zone	Location:	Secondary Location:
MAD-N	Wilmington	Zone 5	Sub 11 Lamokin	

Category	Root Cause	Extended Root Cause
Substation	Fuse FTO Interlock Linkage Lightning Arrestor Oil Leak Operating Mech Other Replacement Relay RTU SF6 Gas Tap Unknown Vandalism Wind	

System Disturbance or Occurrence	Personnel Notified of Event

Time / Date Returned to Normal

Log Complete ☐

check if log entry is completed

Listed are some shortcuts & hints which you may find useful in navigating

1. <CTRL> _<> inserts the system date into the field.
2. <CTRL> <ENTER> Moves the cursor down to a new line when entering data in the "Disturbance or Occurrence"

Last Updated

Select Group to Email

Send Email OR Place Time Stamp

When all new information has been added to the log item, click either 'Send Email' or 'Place Time Stamp' to



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14. **Describes** "System Disturbance or Occurrence" in detail. Include relevant information such as:

- Alarms received
- Times and correct sequence of equipment that tripped
- Action taken
- Times equipment was re-closed
- AC holds in place
- Equipment left out of service
- Relay targets
- Weather conditions at time of event



NEW LOG ENTRY



This form is to be used for entry of new data into the log book.

Index	Date	Time	Circuit, Apparatus, or Event	Type of Event
1510	Thursday, November 30, 2017	1:28 PM	#11 12Kv Bus	Bus

Division	Sub-Divisions	Zone	Location:	Secondary Location:
MAD-N	Wilmington	Zone 5	Sub 11 Lamokin	

Category	Root Cause	Extended Root Cause
Substation	Unknown	

System Disturbance or Occurrence	Personnel Notified of Event
1:20PM: 11 Bus L/O Sub 11 Lamokin. 1101, 1102, 1103, 1104, BB, 2AL Tripped 1:24PM: Field forces advised. Will inspect.	

ATTENTION

Abbreviations & acronyms may be used to make logging process easier. Refer to Appendix B. for typical abbreviations & acronyms

Shortcut ctrl + enter will move cursor to a new line when entering data

Select Group to Email:

Send Email OR Place Time Stamp

When all new information has been added to the log item, click either 'Send Email' or 'Place Time Stamp' to

Time / Date Returned to Normal:

Log Complete ☐

check if log entry is completed

Listed are some shortcuts & hints which you may find useful in navigating

1. <CTRL> .<> inserts the system date into the field.
2. <CTRL> <ENTER> Moves the cursor down to a new line when entering data in the "Disturbance or Occurrence" fields.

Last Updated:



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15. **Provide** names of "Personnel Notified of Event".



NEW LOG ENTRY



This form is to be used for entry of new data into the log book.

Index	Date	Time	Circuit, Apparatus, or Event	Type of Event
1510	Thursday, November 30, 2017	1:28 PM	#11 12Kv Bus	Bus

Division	Sub-Divisions	Zone	Location:	Secondary Location:
MAD-N	Wilmington	Zone 5	Sub 11 Lamokin	

Category	Root Cause	Extended Root Cause
Substation	Unknown	

System Disturbance or Occurrence

1:20PM: 11 Bus L/O Sub 11 Lamokin.
1101, 1102, 1103, 1104, BB, 2AL Tripped
1:24PM: Field forces advised. Will inspect.

Personnel Notified of Event

Morris

Time / Date Returned to Normal

Log Complete ☐

check if log entry is completed

Listed are some shortcuts & hints which you may find useful in navigating

1. <CTRL> _<> inserts the system date into the field.
2. <CTRL> <ENTER> Moves the cursor down to a new line when entering data in the "Disturbance or Occurrence"

Last Updated

Select Group to Email

Send Email OR Place Time Stamp

When all new information has been added to the log item, click either 'Send Email' or 'Place Time Stamp' to



16. **Enters** "Time" and "Date" power or equipment was "Returned to Normal".



NEW LOG ENTRY



This form is to be used for entry of new data into the log book.

Index	Date	Time	Circuit, Apparatus, or Event	Type of Event
1510	Thursday, November 30, 2017	1:28 PM	#11 12Kv Bus	Bus

Division	Sub-Divisions	Zone	Location:	Secondary Location:
MAD-N	Wilmington	Zone 5	Sub 11 Lamokin	

Category	Root Cause	Extended Root Cause
Animal	Squirrel	

System Disturbance or Occurrence	Personnel Notified of Event
1:20PM: 11 Bus L/O Sub 11 Lamokin. 1101, 1102, 1103, 1104, BB, 2AL Tripped 1:24PM: Field forces advised. Will inspect. 1:43PM: Field Forces inspected and report Squirrel was cause of outage. LD advised 1:45PM: 1101, 1102, 1103, 1104, BB, 2AL all closed and holding.	Morris Time / Date Returned to Normal: 1:45PM 11/30/2017 ☐ Log Complete check if log entry is completed

Listed are some shortcuts & hints which you may find useful in navigating

1. <CTRL> .<> inserts the system date into the field.
2. <CTRL> <ENTER> Moves the cursor down to a new line when entering data in the "Disturbance or Occurrence"

Select Group to Email

Send Email OR Place Time Stamp

When all new information has been added to the log item, click either 'Send Email' or 'Place Time Stamp' to

Last Updated



POWER DIRECTOR OPERATING GUIDELINES

FAR-1 Maintaining Electric Traction Logbook

Task Outline

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17. **Checks** box to "Complete Log" entry.

18. If log entry is incomplete (entry is a current event in progress, equipment left OOS etc.):

18a. **Leaves** log complete box unchecked.



NEW LOG ENTRY



This form is to be used for entry of new data into the log book.

Index	Date	Time	Circuit, Apparatus, or Event	Type of Event
1510	Thursday, November 30, 2017	1:28 PM	#11 12Kv Bus	Bus

Division	Sub-Divisions	Zone	Location:	Secondary Location:
MAD-N	Wilmington	Zone 5	Sub 11 Lamokin	

Category	Root Cause	Extended Root Cause
Animal	Squirrel	

System Disturbance or Occurrence	Personnel Notified of Event
1:20PM: 11 Bus L/O Sub 11 Lamokin. 1101, 1102, 1103, 1104, BB, 2AL Tripped 1:24PM: Field forces advised. Will inspect. 1:43PM: Field Forces inspected and report Squirrel was cause of outage. LD advised 1:45PM: 1101, 1102, 1103, 1104, BB, 2AL all closed and holding.	Morris Time / Date Returned to Normal 1:45 PM 11/30/2017 Log Complete ☒ check if log entry is completed Listed are some shortcuts & hints which you may find useful in navigating 1. <CTRL> _<> inserts the system date into the field. 2. <CTRL> <ENTER> Moves the cursor down to a new line when entering data in the "Disturbance or Occurrence" Last Updated

Select Group to Email

Send Email OR Place Time Stamp

When all new information has been added to the log item, click either 'Send Email' or 'Place Time Stamp' to



POWER DIRECTOR OPERATING GUIDELINES

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19. **Selects** appropriate "Group to Email" out information for event.
20. **Clicks** "Send Email".



NEW LOG ENTRY



This form is to be used for entry of new data into the log book.

Index	Date	Time	Circuit, Apparatus, or Event	Type of Event
1510	Thursday, November 30, 2017	1:28 PM	#11 12Kv Bus	Bus

Division	Sub-Divisions	Zone	Location:	Secondary Location:
MAD-N	Wilmington	Zone 5	Sub 11 Lamokin	

Category	Root Cause	Extended Root Cause
Animal	Squirrel	

System Disturbance or Occurrence	Personnel Notified of Event
1:20PM: 11 Bus L/O Sub 11 Lamokin. 1101, 1102, 1103, 1104, BB, 2AL Tripped 1:24PM: Field forces advised. Will inspect. 1:43PM: Field Forces inspected and report Squirrel was cause of outage. LD advised 1:45PM: 1101, 1102, 1103, 1104, BB, 2AL all closed and holding.	Morris Time / Date Returned to Normal 1:45PM 11/30/2017 Log Complete ☒ check if log entry is completed Listed are some shortcuts & hints which you may find useful in navigating 1. <CTRL> <.> inserts the system date into the field. 2. <CTRL> <ENTER> Moves the cursor down to a new line when entering data in the "Disturbance or Occurrence" Last Updated

Select Group to Email

- MAD PD and ET OPS
- NY PD and ET OPS
- NED PD and ET OPS
- MAD North**
- MAD South
- NED
- NYD
- LDs
- Test Email List

Send Email **OR** **Place Time Stamp**

When all new information has been added to the log item, click either 'Send Email' or 'Place Time Stamp' to

ATTENTION

Ensure Microsoft Outlook program is open when sending out email.



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21. **Places** "Time Stamp" on information entered.

- Sending Email automatically places a time stamp on information entered.

22. If no Email is required:

22a. **Clicks** "Place Time Stamp". Time stamp for latest entry appears in "Last Updated" box on bottom right.



NEW LOG ENTRY



This form is to be used for entry of new data into the log book.

Index	Date	Time	Circuit, Apparatus, or Event	Type of Event
1510	Thursday, November 30, 2017	1:28 PM	#11 12Kv Bus	Bus

Division	Sub-Divisions	Zone	Location:	Secondary Location:
MAD-N	Wilmington	Zone 5	Sub 11 Lamokin	

Category	Root Cause	Extended Root Cause
Animal	Squirrel	

System Disturbance or Occurrence	Personnel Notified of Event
1:20PM: 11 Bus L/O Sub 11 Lamokin. 1101, 1102, 1103, 1104, BB, 2AL Tripped 1:24PM: Field forces advised. Will inspect. 1:43PM: Field Forces inspected and report Squirrel was cause of outage. LD advised 1:45PM: 1101, 1102, 1103, 1104, BB, 2AL all closed and holding. 11/30/2017 1:52:09 PM knipplr	Morris Time / Date Returned to Normal 1:45PM 11/30/2017 Log Complete ☒ check if log entry is completed Listed are some shortcuts & hints which you may find useful in navigating 1. <CTRL> _<> inserts the system date into the field. 2. <CTRL> <ENTER> Moves the cursor down to a new line when entering data in the "Disturbance or Occurrence" Last Updated 11/30/2017

Select Group to Email

ABC

Send Email

Place Time Stamp

When all new information has been added to the log item, click either 'Send Email' or 'Place Time Stamp' to



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23. Closes "Form" when finished.



NEW LOG ENTRY



This form is to be used for entry of new data into the log book.

Index	Date	Time	Circuit, Apparatus, or Event	Type of Event
1510	Thursday, November 30, 2017	1:28 PM	#11 12Kv Bus	Bus

Division	Sub-Divisions	Zone	Location:	Secondary Location:
MAD-N	Wilmington	Zone 5	Sub 11 Lamokin	

Category	Root Cause	Extended Root Cause
Animal	Squirrel	

System Disturbance or Occurrence
1:20PM: 11 Bus L/O Sub 11 Lamokin.
1101, 1102, 1103, 1104, BB, 2AL Tripped

1:24PM: Field forces advised. Will inspect.

1:43PM: Field Forces inspected and report Squirrel was cause of outage. LD advised
1:45PM: 1101, 1102, 1103, 1104, BB, 2AL all closed and holding.
11/30/2017 1:52:09 PM knipplr

Personnel Notified of Event
Morris

Time / Date Returned to Normal
1:45PM 11/30/2017

Log Complete ☒
check if log entry is completed

Listed are some shortcuts & hints which you may find useful in navigating
1. <CTRL> _<> inserts the system date into the field.
2. <CTRL> <ENTER> Moves the cursor down to a new line when entering data in the "Disturbance or Occurrence"

Last Updated
11/30/2017

Select Group to Email
ABC

OR

When all new information has been added to the log item, click either 'Send Email' or 'Place Time Stamp' to



24. If follow up information for event becomes available after log entry is completed:

24a. **Opens** Electric Traction Logbook.mdb

24b. **Selects** "Search Log Entries".





25. **Enters** information needed for search query.

- Searching Logbook can be done several ways (entering location, zone, type etc.)

26. **Selects** "Search Through Logbook" Forms at bottom.

AMTRAK

Search the Log Book

Close Query

Search Dates (based on last updated)

Start End

Search Dates based on when entry was initially created only

Start Date End Date

The fields below support partial searches. Example: searching "rich" in location, will bring up any log whose location contains the string "rich" like RICHmond SFC. Note: If you are searching for Zone 01, please enter '01'

Circuit, Apparatus, or Event

Type

Category

Root Cause

Division

Sub Division

Location Sub 11

Secondary Location

Zone

System Disturbance or Occurrence

New Information or Clarification

Search Through Log Book Form

Show as Printable Report



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27. **Unchecks** "Log Complete" box.
28. **Clicks** "Return to Search" on top right.



Index	Date	Time	Circuit, Apparatus, or Event	Type
11	Thursday, November 30, 2017	1:28 PM	#11 12Kv Bus	Bus

Division	SubDivision	Zone	Location	Secondary Location
MAD-N	Wilmington	Zone 5	Sub 11 Lamokin	

Category	Root Cause	Extended Root Cause
Animal	Squirrel	

System Disturbance or Occurrence	Personnel Notified of Event
1:20PM: 11 Bus L/O Sub 11 Lamokin. 1101, 1102, 1103, 1104, BB, 2AL Tripped 1:24PM: Field forces advised. Will inspect. 1:43PM: Field Forces inspected and report Squirrel was cause of outage. LD advised 1:45PM: 1101, 1102, 1103, 1104, BB, 2AL all closed and holding. 11/30/2017 1:52:09 PM knipplr	Morris Time / Date Returned to Normal 1:45PM 11/30/2017 Total Train delay Minutes Acela Delay Minutes Log Complete ☒ Last Updated 11/30/2017



29. Closes "Query".



Search the Log Book

Close Query



Search Dates (based on last updated)

Start	End

Search Dates based on when entry was initially created only

Start Date	End Date

The fields below support partial searches. Example: searching "rich" in location, will bring up any log whose location contains the string "rich" like RICHmond SFC. Note: If you are searching for Zone 01, please enter '01'

Circuit, Apparatus, or Event

Type

Category

Root Cause

Division

Sub Division

Location

Secondary Location

Zone

System Disturbance or Occurrence

New Information or Clarification

Search Through Log Book Forms



Show as Printable Report





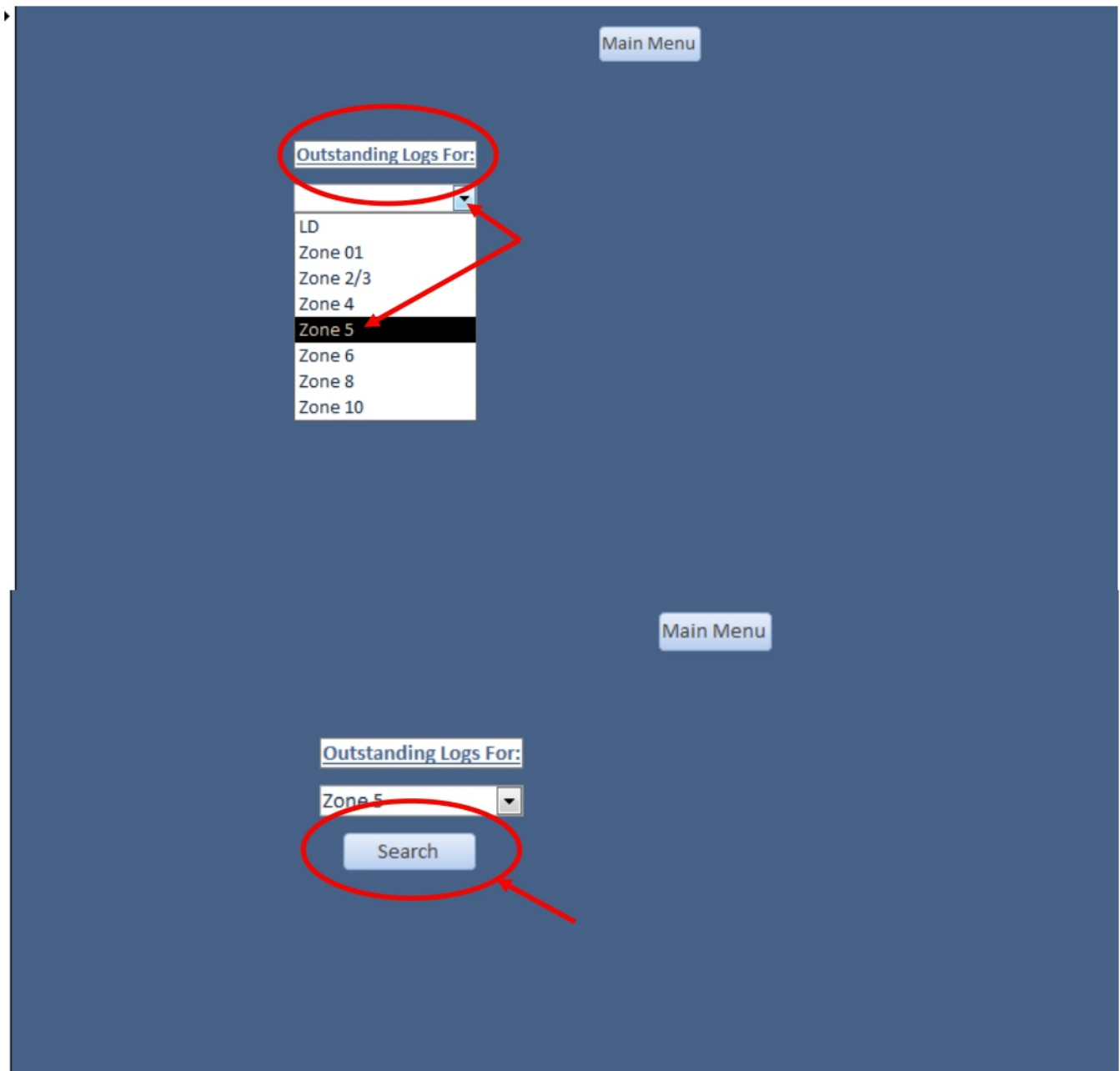
30. **Selects** "Outstanding Log Entries".





31. **Selects** "Zone" where event occurred.

32. **Clicks** "Search" to find log entry.



33. **Scrolls** bottom of screen, using arrow keys, to find log entry.

Outstanding Logs



 Exit form

Index	Date	Time	Circuit, Apparatus, or Event	Type
1526	Thursday, November 30, 2017	1:28 PM	#11 12Kv Bus	Bus

Division	SubDivision	Zone	Location	Secondary Location
MAD-N	Wilmington	Zone 5	Sub 11 Lamokin	

Category	Root Cause	Extended Root Cause
Animal	Squirrel	

System Disturbance or Occurrence

1:20PM: 11 Bus L/O Sub 11 Lamokin.
1101, 1102, 1103, 1104, BB, 2AL Tripped

1:24PM: Field forces advised. Will inspect.

1:43PM: Field Forces inspected and report Squirrel was cause of outage. LD advised
1:45PM: 1101, 1102, 1103, 1104, BB, 2AL all closed and holding.
11/30/2017 1:52:09 PM knipplr

New Information or Clarification

Who was notified

Morris

Date / Time returned to normal

1:45PM 11/30/2017

Total Train Delay Minutes

Acela Delay Minutes

Log Complete ☐

Last Updated

11/30/2017

Major Item ☐

Responsible

Priority

[Show all as a Printable Report](#)

Email Group

Send Email
 OR
 Place Time Stamp

When all new information and updates have been made to each log item, click either 'Send Email' or 'Place Time Stamp' to finalize record.

Record: 14 of 5

No Filter Search



POWER DIRECTOR OPERATING GUIDELINES

FAR-1 Maintaining Electric Traction Logbook

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34. **Enters** "New Information" for event that was reported.

Outstanding Logs



 Exit form

Index	Date	Time	Circuit, Apparatus, or Event	Type
1510	Thursday, November 30, 2017	1:28 PM	#11 12Kv Bus	Bus

Division	SubDivision	Zone	Location	Secondary Location
MAD-N	Wilmington	Zone 5	Sub 11 Lamokin	

Category	Root Cause	Extended Root Cause
Animal	Squirrel	

System Disturbance or Occurrence

1:20PM: 11 Bus L/O Sub 11 Lamokin.
1101, 1102, 1103, 1104, BB, 2AL Tripped

1:24PM: Field forces advised. Will inspect.

1:43PM: Field Forces inspected and report Squirrel was cause of outage. LD advised
1:45PM: 1101, 1102, 1103, 1104, BB, 2AL all closed and holding.
11/30/2017 1:52:09 PM knipplr

New Information or Clarification

1:57PM: Field forces report found a second squirrel at location.

Who was notified

Morris

Date / Time returned to normal

1:45PM 11/30/2017

Total Train Delay Minutes

Acela Delay Minutes

Log Complete ☐

Last Updated

11/30/2017

Major Item ☐

Responsible

Priority

[Show all as a Printable Report](#)

Email Group

[Send Email](#) OR [Place Time Stamp](#)

When all new information and updates have been made to each log item, click either 'Send Email' or 'Place Time Stamp' to finalize record.



POWER DIRECTOR OPERATING GUIDELINES

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35. Checks box to "Complete Log" entry.



Exit form

Index	Date	Time	Circuit, Apparatus, or Event	Type
1510	Thursday, November 30, 2017	1:28 PM	#11 12Kv Bus	Bus

Division	SubDivision	Zone	Location	Secondary Location
MAD-N	Wilmington	Zone 5	Sub 11 Lamokin	

Category	Root Cause	Extended Root Cause
Animal	Squirrel	

System Disturbance or Occurrence
1:20PM: 11 Bus L/O Sub 11 Lamokin.
1101, 1102, 1103, 1104, BB, 2AL Tripped

1:24PM: Field forces advised. Will inspect.

1:43PM: Field Forces inspected and report Squirrel was cause of outage. LD advised
1:45PM: 1101, 1102, 1103, 1104, BB, 2AL all closed and holding.
11/30/2017 1:52:09 PM knippir

Who was notified
Morris

Date / Time returned to normal
1:45PM 11/30/2017

Total Train Delay Minutes

Acela Delay Minutes

Log Complete ☒

Last Updated
11/30/2017

Major Item ☐

Responsible

Priority

Email Group

OR

When all new information and updates have been made to each log item, click either 'Send Email' or 'Place Time Stamp' to finalize record.



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36. **Selects** "Group to Email" out new information for event.

37. **Clicks** "Send Email".

Outstanding Logs
AMTRAK

Exit form

Index	Date	Time	Circuit, Apparatus, or Event	Type
1510	Thursday, November 30, 2017	1:28 PM	#11 12Kv Bus	Bus

Division	SubDivision	Zone	Location	Secondary Location
MAD-N	Wilmington	Zone 5	Sub 11 Lamokin	

Category	Root Cause	Extended Root Cause
Animal	Squirrel	

System Disturbance or Occurrence

1:20PM: 11 Bus L/O Sub 11 Lamokin.
1101, 1102, 1103, 1104, BB, 2AL Tripped

1:24PM: Field forces advised. Will inspect.

1:43PM: Field Forces inspected and report Squirrel was cause of outage. LD advised

1:45PM: 1101, 1102, 1103, 1104, BB, 2AL all closed and holding.

11/30/2017 1:52:09 PM knipplr

Who was notified

Morris

Date / Time returned to normal
1:45PM 11/30/2017

Total Train Delay Minutes

Acela Delay Minutes

Log Complete ☒

Last Updated
11/30/2017

Major Item ☐

Responsible

Priority

Show all as a Printable Report

New Information or Clarification

1:57PM: Field forces report found a second squirrel at location.

Email Group

- PD and ET OPS MAD
- PD and ET OPS NED
- PD and ET OPS NY
- MAD North
- MAD South
- NYD
- NED
- LDs
- TEST Email List

Send Email OR Place Time Stamp

Any information and updates have been made to each log either 'Send Email' or 'Place Time Stamp' to finalize record.



POWER DIRECTOR OPERATING GUIDELINES

FAR-1 Maintaining Electric Traction Logbook

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38. **Places** "Time Stamp" on information entered.

- Sending Email automatically places a time stamp on information entered.

39. If no Email is required:

39a. **Clicks** "Place Time Stamp". Time stamp for latest entry appears in "Last Updated" box on bottom right.

Outstanding Logs
AMTRAK

Exit form

Index	Date	Time	Circuit, Apparatus, or Event	Type
1510	Thursday, November 30, 2017	1:28 PM	#11 12Kv Bus	Bus

Division	SubDivision	Zone	Location	Secondary Location
MAD-N	Wilmington	Zone 5	Sub 11 Lamokin	

Category	Root Cause	Extended Root Cause
Animal	Squirrel	

System Disturbance or Occurrence

1:20PM: 11 Bus L/O Sub 11 Lamokin.
1101, 1102, 1103, 1104, BB, 2AL Tripped

1:24PM: Field forces advised. Will inspect.

1:43PM: Field Forces inspected and report Squirrel was cause of outage. LD advised

1:45PM: 1101, 1102, 1103, 1104, BB, 2AL all closed and holding.

11/30/2017 1:52:09 PM knippjr

1:57PM: Field forces report found second squirrel at location.

11/30/2017 2:01:47 PM knippjr

New Information or Clarification

Who was notified

Morris

Date / Time returned to normal

1:45PM 11/30/2017

Total Train Delay Minutes

Acela Delay Minutes

Log Complete ☒

Last Updated

11/30/2017

Major Item ☐

Responsible

Priority

Show all as a Printable Report

Email Group

Send Email OR Place Time Stamp

When all new information and updates have been made to each log item, click either 'Send Email' or 'Place Time Stamp' to finalize record.

Baseline: 04.19.17



FAR-2 REQUESTING VACATION

1.0 INTRODUCTION

The Wilmington Power Director Office is 24-hour 7 days a week operation. The office is staffed by four Power Directors per shift except when system emergencies occur, or inclement weather is projected. It is therefore important that the office not be put at risk left understaffed if such a condition should arise.

Power Directors requesting, cancelling, or changing vacation or personal days must apply, in writing, to the immediate supervisor 48 hours advance notice is required and no exceptions will be made. Only two Power Directors will be granted off at a time.

A week's vacation will take precedence over a single day(s) request and no time will be reserved for future requests. Approved vacations of 5 or more consecutive working days which fall on a major holiday week are not eligible to be rescheduled. Future changes will be considered only if the changes are made on an exchange basis, i.e., an existing day must be canceled for the requested day to be granted. Request for cancellation of vacation or personal day must be in writing to the immediate supervisor no later than 24 hours in advance for consideration by the Corporation.

The vacation request calendar, as shown in Figure FAR 2-1, must be submitted to the immediate supervisor by January 31 of that calendar year. All eligible vacation time must be requested. Failure to do so will result in assignment by the corporation. There will be no reminders. All vacation request, prior to January 31 of the next calendar year, will begin on December 1st and end at the close of business on December 17th of the current calendar year. Any vacation requests after the December 17th deadline will be handled on a first request basis regardless of seniority for the following month of January.

Vacation requests submitted prior to the deadline will be scheduled in seniority order. Vacation requests or changes submitted after the deadline will be handled on a first request basis regardless of seniority.

Figure FAR 2-2 shows vacation entitlements.

2.0 TASK OBJECTIVE

Submit vacation or personal day requests by entering all appropriate information into the vacation request calendar and submit to immediate supervisor.

3.0 RECOMMENDED CONDITIONS

This task should be performed when requesting vacation or personal day.

4.0 REFERENCES

- WILMPD Vacation Calendar.xls
- Appendix B. Abbreviations & Acronyms



POWER DIRECTOR OPERATING GUIDELINES

FAR-2 Requesting Vacation

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Task Outline

5.0 POWER DIRECTOR ACTION

To request vacation or personal day, the **Power Director**:

1. **Opens** Vacation Calendar.xls

POWER DIRECTOR VACATION CALENDAR 2019

Notes

January						
Su	M	Tu	W	Th	F	Sa
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

February						
Su	M	Tu	W	Th	F	Sa
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28		

March						
Su	M	Tu	W	Th	F	Sa
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

April						
Su	M	Tu	W	Th	F	Sa
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30				

May						
Su	M	Tu	W	Th	F	Sa
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

June						
Su	M	Tu	W	Th	F	Sa
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30						

July						
Su	M	Tu	W	Th	F	Sa
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

August						
Su	M	Tu	W	Th	F	Sa
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

September						
Su	M	Tu	W	Th	F	Sa
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30					

October						
Su	M	Tu	W	Th	F	Sa
	1	1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

November						
Su	M	Tu	W	Th	F	Sa
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

December						
Su	M	Tu	W	Th	F	Sa
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

Figure FAR 2-1. Power Director Vacation Calendar

**FAR-3 MAINTAINING OUT OF SERVICE EQUIPMENT LOG****1.0 INTRODUCTION**

Each Power Director operating zone maintains an Out-of-Service Equipment Log. The purpose of this log is to maintain an up-to-date list of all equipment on the Amtrak Electric Traction electrification system that is not available for service, whatever the cause.

When equipment is removed from service, the Power Director selects the appropriate tab and enters the date, location, equipment type, the reason for the equipment to be left out of service.

When the equipment is returned to service, that date is also entered as well as any repairs that were made. Properly maintaining this log allows for efficient Shift Turnovers, ensuring all the history and details of that equipment can be easily researched and information accurately recalled.

2.0 TASK OBJECTIVE

Enter all appropriate information into the Out-of-Service Equipment log to ensure a complete and accurate record is maintained of all system equipment removed from or returned to service.

3.0 RECOMMENDED CONDITIONS

This task should be performed as soon as possible after a piece of system equipment has been removed from or returned to service.

4.0 REFERENCES

- Out of Service Equipment.xls
- Microsoft Outlook Mail
- SCADA Operating System
- Appendix A. Glossary
- Appendix B. Abbreviations & Acronyms

**5.0 POWER DIRECTOR ACTION**

To enter information into the "Out of Service Equipment Log", the **Power Director**:

1. **Opens** Out of Service Equipment.xls for appropriate operating zone.
2. **Selects** equipment type tab at bottom of sheet.

1	DATE	SWITCH	LOCATION	REASON FOR OUT OF SERVICE	REPAIRS MADE TO RETURN TO SERVICE	DATE
2	04/01/19	22W	Cork	Lost indication	Blown fuse replaced/RTS	04/01/19
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						
25						
26						

Transmission line Air Breaks Breakers **Sect. Switches** Signal Machine Signal Equipment High Side Switch Transformers Disconnects Service, Potential TRNF Heater Station

3. **Enters** date equipment removed from or returned to service.

1	DATE	SWITCH	LOCATION	REASON FOR OUT OF SERVICE	REPAIRS MADE TO RETURN TO SERVICE	DATE
2	04/01/19	22W	Cork	Lost indication	Blown fuse replaced/RTS	04/01/19
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						
25						
26						

Transmission line Air Breaks Breakers **Sect. Switches** Signal Machine Signal Equipment High Side Switch Transformers Disconnects Service, Potential TRNF Heater Station



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4. Enters equipment designation.

1	DATE	SWITCH	LOCATION	REASON FOR OUT OF SERVICE	REPAIRS MADE TO RETURN TO SERVICE	DATE
2	04/01/19	22W	Cork	Lost indication	Blown fuse replaced/RTS	04/01/19
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						
25						

Transmission line Air Breaks Breakers **Sect. Switches** Signal Machine Signal Equipment High Side Switch Transformers Disconnects Service, Potential TRNF Heater Station

ATTENTION

Multiple circuits or apparatus must be recorded separately when they are placed OOS.

5. Selects location of equipment.

1	DATE	SWITCH	LOCATION	REASON FOR OUT OF SERVICE	REPAIRS MADE TO RETURN TO SERVICE	DATE
2	04/01/19	22W	Cork	Lost indication	Blown fuse replaced/RTS	04/01/19
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						
25						

Transmission line Air Breaks Breakers **Sect. Switches** Signal Machine Signal Equipment High Side Switch Transformers Disconnects Service, Potential TRNF Heater Station



6. If equipment was removed from service:

6a. Enters reason equipment was removed.

1	DATE	SWITCH	LOCATION	REASON FOR OUT OF SERVICE	REPAIRS MADE TO RETURN TO SERVICE	DATE
2	04/01/19	22W	Cork	Lost indication	Blown fuse replaced/RTS	04/01/19
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						
25						

Transmission line Air Breaks Breakers **Sect. Switches** Signal Machine Signal Equipment High Side Switch Transformers Disconnects Service, Potential TRNF Heater Station

7. If equipment was returned to service:

7a. Enters repairs that were made.

1	DATE	SWITCH	LOCATION	REASON FOR OUT OF SERVICE	REPAIRS MADE TO RETURN TO SERVICE	DATE
2	04/01/19	22W	Cork	Lost indication	Blown fuse replaced/RTS	04/01/19
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						
25						

Transmission line Air Breaks Breakers **Sect. Switches** Signal Machine Signal Equipment High Side Switch Transformers Disconnects Service, Potential TRNF Heater Station

ATTENTION

The OOS Log must be updated when additional information is made available.

**FAR-4 MAINTAINING CLEARANCE FORM NEC.84****1.0 INTRODUCTION**

The Clearance Form (NEC.84) is a legal document from the Power Director to Class "A" employee declaring that the equipment to be worked on has been de-energized and isolated from hazardous sources of energy as governed by minimum approach distances.

The Clearance Form is used to record the description of the clearance, referred to as the body of the clearance. In addition, all permissions and / or notifications are listed as well as all switching, and actions performed under the direction of the Power Director. The limits of a clearance are the blocking points established by the switching procedures to de-energize (dangerous to life) an area as defined by the body of the clearance, that is an understanding between the Power Director and the Class "A" employee. The clearance number is a specific, identifying number assigned to a clearance. It is imperative that each Power Director fill out the Clearance Form in an exact manner so that, after Shift Turnover, the incoming Power Director can look at the clearance and determine the status of the clearance.

Figure FAR 4-1 shows the front of the Clearance Form (NEC.84) which includes the clearance request, permissions or notifications pertaining to the clearance, switching record, testing clearance requested de-energized, issuing, and releasing of the clearance. Figure FAR 4-9 shows the back of the Clearance Form (NEC.84) which includes releasing the clearance temporary, re-issuing the clearance, transferring of the clearance between two Class "A" employees or a clearance transfer between a Class "A" employee and the Power Director Office.

2.0 TASK OBJECTIVE

Record all appropriate information, in a neat and legible manner, on the Clearance Form (NEC.84) to ensure a complete and accurate record is maintained of all permissions, device operations, switching orders and system grounds (if applicable) pertaining to the clearance.

3.0 RECOMMENDED CONDITIONS

This task should be performed during the performance of any of the following:

- Requesting a clearance
- Permissions or notifications pertaining to clearance
- Switching instructions to de-energize or re-energize circuits or apparatus
- Testing circuits or apparatus de-energized
- Issuing and releasing clearance
- Releasing clearance temporary / re-issue clearance
- Transferring a clearance between Class "A" employees
- Transferring a clearance to / from the Power Director Office



4.0 REFERENCES

- Power Director Clearance Form (NEC.84)
- SCADA Operating System
- Contact List
- Power Sectionalizing Plate Reference Book
- AMT.2 Electrical Operating Rules & Instructions
- SOI.203 Voltage Testing and Verification Procedure
- SOI.211 Electrical Clearance Procedure
- Appendix A. Glossary
- Appendix B. Abbreviations & Acronyms

**5.0 POWER DIRECTOR ACTION**

To enter information on Clearance Form (NEC.84), the **Power Director**:

**Electric Traction Power Director Clearance Form**

Clearance No: 1 Day: 2 Date: 3 Time Requested: 4 ☐ AM ☐ PM

Power must be removed from: 5 On account of: 6 Location: 7

Remarks: 8

Figure FAR 4-2. Clearance Request Section of Clearance Form NEC.84

Refer to “clearance request section” of NEC.84 form, which consists of spaces 1-8 in Figure FAR 4-2 above.

1. **Enters** “clearance number”.
2. **Writes** “day” clearance was requested.
3. **Writes** “date” clearance was requested.
4. **Adds** “time” clearance was requested. Adds check mark for AM or PM.
 - Entries on lines 2, 3 and 4 are when Class “A” employee makes official clearance request.
5. **Identifies** circuit or apparatus where “power must be removed from” such as:

• 124 transmission line	• 100 cycle signal machine
• 116,116G ABS	• #2 XFMR
• 2201 trolley	• 6900 volt signal line
6. **Provides** reason “on account of” for removal of power such as:

• Maintenance	• Protection
• Repair	• Catenary inspection
• Replacement	• Doble test
7. **Enters** “location” where work will be performed such as:

• Sub 09 Zoo	• Route 202 OHB MP 25.47
• Bacon Interlocking	• B&P Tunnel
• EBHS Bridge at Shore	• Walnut St.
8. **Provides** “remarks” pertaining to clearance such as:

• Clear time	• Supervisor / Foreman on location
• Contact numbers	• Clearance numbers sharing same blocking
• EEPs “BDR” Code	•



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Train Dispatcher/ Others

9	Plate: 10	Notified: 11	☐ AM ☐ PM	Permission: 12	☐ AM ☐ PM
	Plate: _____	Notified: _____	☐ AM ☐ PM	Permission: _____	☐ AM ☐ PM
	Plate: _____	Notified: _____	☐ AM ☐ PM	Permission: _____	☐ AM ☐ PM
	Plate: _____	Notified: _____	☐ AM ☐ PM	Permission: _____	☐ AM ☐ PM
13	Notified: 14	☐ AM ☐ PM	Permission: 15	☐ AM ☐ PM	Completed: 16
Signal Interruption					
Load Dispatcher: 17	Permit No. 18	Notified: 19	☐ AM ☐ PM	Permission: 20	☐ AM ☐ PM
				In Effect: 21	☐ AM ☐ PM

Figure FAR 4-3. Clearance Permissions Section of Clearance Form NEC.84

Refer to "clearance permissions section" of NEC.84 form, which consists of spaces 9-21 in Figure FAR 4-3 above.

9. **Provides** "names and / or title of people" required to provide permissions for clearance such as:

- Train Dispatchers
- Power Directors
- Tower Operators
- Utility Operators
- Foreign Railroad Power Dispatchers
- Engine House Foreman
- C&S Department

10. **Records** power sectionalizing "plate" name and number as required by plate reference book.

11. **Enters** time individuals named in No.09 above were "notified". Adds check mark for AM or PM.

12. **Enters** time "permission received" for authorization request from individuals named in No.09 above. Adds check mark for AM or PM.

13. **Provides** "names and / or title" of people required to give permission prior to taking a signal interruption.

14. **Enters** time individuals named in No.13 above were "notified" of signal interruption request. Adds check mark for AM or PM.

15. **Enters** time "permission received" for signal interruption from individuals named in No.13. Adds check mark for AM or PM.

16. **Notes** time signal interruption was "completed". Adds check mark for AM or PM.

17. **Adds** "name" of Load Dispatcher.

18. **Enters** "permit number" that was supplied.

19. **Enters** time Load Dispatcher was "notified" of permit request. Adds check mark for AM or PM.

20. **Enters** time "permission received" from Load Dispatcher to de-energize circuit or apparatus. Adds check mark for AM or PM.

21. **Records** time permit was put "in effect". Adds check mark for AM or PM.

- When primary circuit or apparatus is de-energized
- 138 kV ground switch is closed for transmission line clearances



Location	Device			Opened		Tagged		Tag Removed		Closed	
	Switch	Breaker	Air Break	Time:	Date:	Time:	Date:	Time:	Date:	Time:	Date:
22	23	24	25	2	6	2	7	2	8	2	9

Figure FAR 4-4. Switching and Tagging of Devices Section of Clearance Form NEC.84

Refer to “switching / tagging of devices section” of NEC.84 form, which consists of spaces 22-29 in Figure FAR 4-4 above.

22. **Adds** “location” of devices to be operated as identified in columns 23, 24 and 25 such as:

- Signal Locations: P631 Gap, CP 36.62 Ruthby,
- Substations: Sub 15 Bacon Hill, Sub 64 Frazer
- Interlockings: Phil, Zoo, Thorn, Charles
- Towers: Zoo Tower
- Signal Bridges: EBHS Shore
- Yards: Ivy City Yard, PCY

23. **Enters** specific name of “switch” to be operated such as:

- Signal equipment disconnects: 52B&T, 52L 1-2-3, 52BL, 52-1, 152T, T1-T2, Motor Starter
- Signal breaker disconnects: LB1-LB2, SB1-SB2, 352P-352F
- Sect. switches: 33S, 22N, 11W
- Trolley breaker disconnect switches: 1604 B&F, 903 B&F
- Track heater station disconnects: HTRL3, HT4, HSM, HSE, HT4W
- Potential and Service XFMR switches: P15B, S15B, S1B, P3, S3
- Low side breaker disconnects: 1ALBs, 2ALBs, 3LBs
- Line switches: 2301L, 3003L, 1601L
- Signal Line disconnects: East, West, North, South
- “T” disconnect switches: 2401 T, 6404 T, 2502 T

24. **Enters** specific name of circuit “breaker” to be operated such as:

- Trolley breakers: 6502, 3001, 1102
- Signal breakers: 252, 52A, 152A, 252A, 252B, 252C, 252E, 352
- Converter Station breakers: 4S, 4SN, J123, J223
- Low Rupture breakers: 119, 427, 217
- Low side breakers: 1AL, 2L, 4L
- Bus/ Bus Tie breakers: BB, BB12, BB1, B61T
- Feeder breakers: U1, U2, 1A9,
- Master breakers: 26M1, 25M4

25. **Enters** specific name of “air break” switch to be operated such as:

- Transmission tie switches: 21, 12, 22HT, 176
- Transmission line / ground switches: 123, 123G, 130W, 130WG, 1FP, 1FPG
- High side switches: 1H, 2AH, P3H

26. **Records** time / date device listed was “opened” or checked open.

27. **Records** time / date “tag applied” to device listed.

- Paper: Do Not Operate red tag (NEC-105)
- Electronic: SCADA

28. **Records** time / date “tag removed” from device listed.

29. **Records** time / date that device listed was “closed”.

- If device is left open, enters “open” in space.

***ATTENTION***

The Switching / Tagging of Devices Section of Form can also be used to track additional information

Location	Device			Opened		Tagged		Tag Removed		Closed	
	Switch	Breaker	Air Break	Time:	Date:	Time:	Date:	Time:	Date:	Time:	Date:
Sub 10 Glenolden	DC removed from 1AH at _____			Restored at _____							
"	Secondary Fuses Removed from S11 and P11 Service and Potential Transformers at _____			Restored at _____							
"	Bus 10 Potential transferred to Bus 11 at _____										

138 kV ground switch checked closed by: 30 Location: 31 at: 32 ☐ AM ☐ PM

33 Permission to test (circuit/apparatus) de-energized at: 34 ☐ AM ☐ PM

Employee

tested (circuit/apparatus) de-energized at: 35 ☐ AM ☐ PM

Figure FAR 4-5. Testing Circuit / Apparatus De-Energized Section of Clearance Form NEC.84

Refer to "testing circuit / apparatus de-energized section" of NEC.84 form, which consists of spaces 30-35 in Figure FAR 4-5 above.

30. **Enters** "name" of Class "A" employee reporting (138 kV) ground switch visually checked closed in field.
31. **Adds** "location(s)" where (138 kV) ground switch was visually checked closed.
32. **Records** "time" (138 kV) ground switch was visually checked closed. Adds check mark for AM or PM.
33. **Enters** "name" of Class "A" employee testing circuit / apparatus de-energized.
34. **Records** time Class "A" employee given "permission to test circuit / apparatus de-energized". Adds check mark for AM or PM.
35. **Records** time Class "A" employee "reporting circuit / apparatus tested de-energized". Adds check mark for AM or PM.



POWER DIRECTOR OPERATING GUIDELINES

FAR-4 Maintaining Clearance Form NEC.84

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Clearance No: 36 Day: 37 Date: 38 To: 39

Power has been removed from the following circuit/apparatus:

40

Permission to ground above circuit/apparatus: Time effective: 41 ☐ AM ☐ PM Clearance repeated correctly at: 42 ☐ AM ☐ PM

No. of Grounds applied: 43 Power Director: 44

Clearance Issued (Print/ Sign)

Location of Grounds: 45

Figure FAR 4-6. Issuing a Clearance Section of Clearance Form NEC.84

Refer to "issuing a clearance section" of NEC.84 form, which consists of spaces 36-45 in Figure FAR 4-6 above.

36. **Enters** "clearance number".
37. **Enters** "day" clearance is being issued.
38. **Enters** "date" clearance is being issued.
39. **Enters** "name" of Class "A" employee receiving clearance.
40. **Writes** circuit / apparatus where "power has been removed". DO NOT use abbreviations.
 - referred to as body of clearance being issued
41. **Enters** time clearance was made "effective". Adds check mark for AM or PM.
42. **Enters** time clearance body and effective time "repeated correctly" by Class "A" employee. Adds check mark for AM or PM.
43. **Records** "number of grounds applied" to circuit / apparatus as reported by Class "A" employee.
44. **Prints** and **signs** name after "clearance issued" to Class "A" employee.
45. **Records** "locations where grounds applied" to circuit/apparatus as reported by Class "A" employee.

No. of Grounds removed: 46Clearance No: 47 Day: 48 Date: 49 Employee: 50Reports work completed, all personnel clear, grounds 51 ☐ Removed ☐ NOT Removed from following circuit/apparatus: 52 (read body of clearance)53 ☐ OK ☐ NOT OK to energize at: 54 ☐ AM ☐ PM 55 ☐ Energized ☐ NOT Energized at: 56 ☐ AM ☐ PM**Figure FAR 4-7. Releasing a Clearance Section of Clearance Form NEC.84**

Refer to "releasing a clearance section" of NEC.84 form, which consists of spaces 46-56 in Figure FAR 4-7 above.

46. **Records** "number and location of grounds" that were removed from circuit / apparatus as reported by Class "A" employee.
47. **Enters** "clearance number".
48. **Enters** "day" clearance is being released.
49. **Enters** "date" clearance is being released.
50. **Enters** "name" of Class "A" employee releasing clearance.
51. **Places** check mark to show condition of temporary protective grounds. "removed or not removed"
52. **Reads** circuit / apparatus as stated in No.40 above. "body of clearance" being released
53. **Places** check mark to state if circuit / apparatus is "OK or NOT OK" to energize.
54. **Enters** time circuit / apparatus is "OK or NOT OK" to energize. Adds check mark for AM or PM.
55. **Places** check mark to show condition of circuit / apparatus. "energized or NOT energized"
56. **Enters** time circuit / apparatus was "energized or NOT energized". Adds check mark for AM or PM.



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Train Dispatcher/ Others

57 Plate: 58 Notified: 59 ☐ AM ☐ PM Released: 60 ☐ AM ☐ PM

Plate: _____ Notified: _____ ☐ AM ☐ PM Released: _____ ☐ AM ☐ PM

Plate: _____ Notified: _____ ☐ AM ☐ PM Released: _____ ☐ AM ☐ PM

Plate: _____ Notified: _____ ☐ AM ☐ PM Released: _____ ☐ AM ☐ PM

61 Notified: 62 ☐ AM ☐ PM Permission: 63 ☐ AM ☐ PM Completed: 64 ☐ AM ☐ PM

Signal Interruption

Load Dispatcher: 65 Permit No. 66 Notified: 67 ☐ AM ☐ PM Released: 68 ☐ AM ☐ PM Completed: 69 ☐ AM ☐ PM

Power Director: 70

Clearance Completed (Print/ Sign)

Figure FAR 4-8. Clearance Permissions Section of Clearance Form NEC.84

Refer to "clearance permissions section" of NEC.84 form, which consists of spaces 51-70 in Figure FAR 4-8 above.

57. **Provides** "names and / or title of people" notified of clearance release such as:

- Train Dispatchers
- Power Directors
- Tower Operators
- Utility Operators
- Foreign Railroad Power Dispatchers
- Engine House Foreman
- C&S Department

58. **Records** power sectionalizing "plate" name and number to be released.

59. **Enters** time individuals named in No.57 above were "notified". Adds check mark for AM or PM.

60. **Enters** time plate was "released". Adds check mark for AM or PM.

61. **Provides** "names and / or title" of people required to give permission prior to taking a signal interruption.

62. **Enters** time individuals named in No.61 above were "notified" of signal interruption request. Adds check mark for AM or PM.

63. **Enters** time "permission received" for signal interruption from individuals named in No.61. Adds check mark for AM or PM.

64. **Notes** time "signal interruption" was completed. Adds check mark for AM or PM.

65. **Adds** "name" of Load Dispatcher.

66. **Enters** "permit number".

67. **Enters** time Load Dispatcher was "notified" of permit release. Adds check mark for AM or PM.

68. **Enters** time "permission received" from Load Dispatcher to re-energize circuit or apparatus. Adds check mark for AM or PM.

69. **Records** time permit was "completed". Adds check mark for AM or PM.

70. **Prints** and **signs** name after "clearance completed".



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Temporary Clearance Release

No. of Grounds removed: 71

Clearance No: 72 Day: 73 Date: 74 Employee: 75

Reports all personnel clear, grounds removed from following circuit/apparatus:

76

OK to energize temporary at: 77 ☐ AM ☐ PM Energized at: 78 ☐ AM ☐ PM

Location	Device Closed	Time	Train Dispatcher/ Others	Plate(s)	Released Time
79	80	81	82	83	84

Power Director: 85
Clearance Released (Print/ Sign)

Clearance Reissue

Train Dispatcher/ Others	Plate(s)	Time Notified	Permission Time	Location	Device Opened	Time
86	87	88	89	90	91	92

93
Employee Permission to test (circuit/apparatus) de-energized at: 94 ☐ AM ☐ PM

tested (circuit/apparatus) de-energized at: 95 ☐ AM ☐ PM

Clearance No: 96 Day: 97 Date: 98 To: 99

Power has been removed from the following circuit/apparatus: **100** (read body of clearance)

Permission to ground above circuit/apparatus: Time effective: 101 ☐ AM ☐ PM Clearance repeated correctly at: 102 ☐ AM ☐ PM

No. of Grounds applied: 103 Power Director: 104
Clearance Reissued (Print/ Sign)

Location of Grounds: 105

Transfer of Clearance No. 106

Circuit/apparatus: 107

Employee/ Power Director Office	Time	Date	Power Director	No. of Grounds	Ground Locations
108	109	110	111	112	113

NEC 84

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Figure FAR 4-9. Back of Blank Clearance Form NEC.84

**Temporary Clearance Release**No. of Grounds removed: 71Clearance No: 72 Day: 73 Date: 74 Employee: 75

Reports all personnel clear, grounds removed from following circuit/apparatus:

76OK to energize temporary at: 77 ☐ AM ☐ PM Energized at: 78 ☐ AM ☐ PM

Location	Device Closed	Time	Train Dispatcher/ Others	Plate(s)	Released Time
<u>79</u>	<u>80</u>	<u>81</u>	<u>82</u>	<u>83</u>	<u>84</u>

Power Director: 85

Clearance Released (Print/ Sign)

Figure FAR 4-10. Temporary Clearance Release Section of Clearance Form NEC.84

Refer to "temporary clearance release section" of NEC.84 form, which consists of spaces 71-85 in Figure FAR 4-10 above.

71. **Records** "number and location of grounds" that were removed from circuit / apparatus as reported by Class "A" employee.
72. **Enters** "clearance number".
73. **Enters** "day" clearance is being released temporary.
74. **Enters** "date" clearance is being released temporary.
75. **Enters** "name" of Class "A" employee releasing clearance temporary.
76. **Writes** circuit / apparatus as stated in step No.40. DO NOT use abbreviations.
 - referred to as body of clearance being released temporary
77. **Enters** time circuit / apparatus is OK to "energize temporary". Adds check mark for AM or PM.
78. **Enters** time circuit / apparatus was "energized". Adds check mark for AM or PM.
79. **Adds** "location" of device to be closed.
80. **Enters** specific name of "device" to be closed.
81. **Enters** "time" tag removed from device and closed. Includes AM or PM as part of time.
82. **Provides** "names and / or title of people" required to be notified.
83. **Records** power sectionalizing "plate" name and number to be released.
84. **Enters** time plate was "released". Includes AM or PM as part of time.
85. **Prints** and **signs** name after "clearance released".



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Clearance Reissue

Train Dispatcher/ Others	Plate(s)	Time Notified	Permission Time	Location	Device Opened	Time
86	87	88	89	90	91	92

93

Employee

Permission to test (circuit/apparatus) de-energized at: **94** ☐ AM ☐ PM

tested (circuit/apparatus) de-energized at: **95** ☐ AM ☐ PM

Clearance No: **96** Day: **97** Date: **98** To: **99**

Power has been removed from the following circuit/apparatus: **100** (read body of clearance)

Permission to ground above circuit/apparatus: Time effective: **101** ☐ AM ☐ PM Clearance repeated correctly at: **102** ☐ AM ☐ PM

No. of Grounds applied: **103** Power Director: **104**

Clearance Reissued (Print/ Sign)

Location of Grounds: **105**

Figure FAR 4-11. Clearance Reissue Section of Clearance Form NEC.84

Refer to "clearance reissue section" of NEC.84 form, which consists of spaces 86-105 in Figure FAR 4-11 above.

86. **Provides** "names and / or title of people" required to provide permissions for clearance.
87. **Records** power sectionalizing "plate" name and number as required by plate reference book.
88. **Enters** time people named in No.16 above were "notified". Includes AM or PM as part of time.
89. **Enters** time "permission received" for clearance authorization request from individuals named in No.16 above. Includes AM or PM as part of time.
90. **Adds** "location" of device to be opened.
91. **Enters** specific name of device to be "opened and tag applied".
92. **Enters** "time" device was opened and tag applied. Includes AM or PM as part of time.
93. **Enters** "name" of Class "A" employee testing circuit / apparatus de-energized.
94. **Records** time Class "A" employee given "permission to test circuit / apparatus de-energized". Adds check mark for AM or PM.
95. **Records** time Class "A" employee "reporting circuit / apparatus tested de-energized". Adds check mark for AM or PM.
96. **Enters** "clearance number".
97. **Enters** "day" clearance is being reissued.
98. **Enters** "date" clearance is being reissued.
99. **Enters** "name" of Class "A" employee receiving clearance.



100. **Reads** circuit / apparatus as stated in No.06 above. "body of clearance" being reissued
101. **Enters** time clearance was made "effective". Adds check mark for AM or PM.
102. **Enters** time clearance body and effective time "repeated correctly" by Class "A" employee. Adds check mark for AM or PM.
103. **Records** "number of grounds applied" to circuit / apparatus as reported by Class "A" employee.
104. **Prints** and **signs** name after "clearance reissued" to Class "A" employee.
105. **Records** "location where grounds applied" to circuit / apparatus as reported by Class "A" employee.

Transfer of Clearance No. 106

Circuit/apparatus: _____

107

Employee/ Power Director Office	Time	Date	Power Director	No. of Grounds	Ground Locations
108	109	110	111	112	113

Figure FAR 4-12. Clearance Transfer Section of Clearance Form NEC.84

Refer to "clearance transfer section" of NEC.84 form, which consists of spaces 106-113 in Figure FAR 4-12 above.

106. **Enters** "clearance number" being transferred.
107. **Writes** "circuit / apparatus" being transferred. DO NOT use abbreviations.
 - referred to as body of clearance being transferred
108. **Enters** "Class "A" employee or Power Director Office" clearance is being transferred to.
109. **Enters** "time" clearance transferred. Includes AM or PM as part of time.
110. **Enters** "date" clearance transferred.
111. **Signs** name after completion of clearance transfer.
112. **Records** "number of grounds applied" to circuit / apparatus as reported by Class "A" employee.
113. **Records** "locations where grounds applied" to circuit / apparatus as reported by Class "A" employee.

**FAR-5 INTERPRETING PLANNED OUTAGE APPLICATION FORM****1.0 INTRODUCTION**

The Planned Outage Application, as shown in Figure FAR 5-1, is the form used by Electric Traction personnel when requesting a planned outage. The purpose of the form is to show who is scheduled to work where, why, the nature of the work, power needed to perform the work, etc. The information for the planned outage is provided by Electric Traction field personnel and is referred to by the Load Dispatcher and Power Director when planning the day or week to confirm a scheduled outage. This allows the Load Dispatcher and Power Director to plan for scheduled work as the shift starts.

Operations Support Personnel must perform an Operational Planning Analysis on all outage requests prior to being approved to ensure Amtrak's 25 Hz transmission system's integrity, stability and configuration is maintained, it is therefore important that this form be understood correctly. Figure FAR 5-2 shows a completed Planned Outage Application form.

2.0 TASK OBJECTIVE

Interpret information contained in a Planned Outage Application form.

3.0 RECOMMENDED CONDITIONS

This task should be performed when a Planned Outage Application is received.

4.0 REFERENCES

- ET Planned Outage Application Form.xls
- Microsoft Outlook Mail
- Appendix A. Glossary
- Appendix B. Abbreviations & Acronyms



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FAR-5 Interpreting Planned Outage Application Form

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ELECTRIC TRACTION PLANNED OUTAGE APPLICATION

Type:	☐ AIR BREAK /GROUND SWITCH	☐ BREAKER	☐ BUS SECTION	☐ CABLE
	☐ CATENARY	☐ CONVERTER STATION	☐ HEATER STATION	☐ HIGH SIDE SWITCH
	☐ 138 kV ROOF BUS SECTION	☐ SIGNAL BREAKER	☐ SIGNAL LINE	☐ SIGNAL MACHINE
	☐ "T" DISC. SWITCH	☐ THIRD RAIL	☐ TRANSMISSION	☐ TRANSFORMER
Outage(s) Requested:				
Work Location:				
Scope of Work:				
Requested by:				
Day(s) work to be done:	☐ MONDAY ☐ TUESDAY ☐ WEDNESDAY ☐ THURSDAY ☐ FRIDAY ☐ SATURDAY ☐ SUNDAY			
Date(s):		Start time:	☐ DAILY ☐ CONTINUOUS	
		End time:		
Emergency restoration time:		Amtrak contact:		
Voltage level:		Contact #:		
Type of work:	☐ CORE ☐ CAPITAL ☐ REIMBURSABLE			
Cost Cent:	Gang:	Project # (if other than core):		
Special switching and/or ground locations:				
For Load Dispatcher use only				
Date received:				
Status:	☐ APPROVED ☐ DENIED ☐ CANCELLED ☐ CONDITIONAL APPROVAL			
By:				
Notes/ remarks:				

Figure FAR 5-1. Blank Planned Outage Application Form

**5.0 POWER DIRECTOR ACTION**

To interpret the Planned Outage Application Form, the **Power Director**:

1. **Opens** ET Planned Outage Application form.xls
2. **Determines** "Type" of outage requested.

Type:	☐ AIR BREAK /GROUND SWITCH	☐ BREAKER	☐ BUS SECTION	☐ CABLE
	☒ CATENARY	☐ CONVERTER STATION	☐ HEATER STATION	☐ HIGH SIDE SWITCH
	☐ 138 kV ROOF BUS SECTION	☐ SIGNAL BREAKER	☒ SIGNAL LINE	☐ SIGNAL MACHINE
	☐ "T" DISC. SWITCH	☐ THIRD RAIL	☒ TRANSMISSION	☐ TRANSFORMER

3. **Identifies** "Outage Requested".

Outage(s) Requested:	7001 trolley between the 11E switch at Rheems, Sub 69 Landisville, and section breaks 6900v signal power line between the east switches at P1228 location and the west switches at P1209 location No. 170 138kv transmission line between Sub 70 Rheems and Sub 69 Landisville
-----------------------------	--

4. **Distinguishes** "Location" and "Scope" of work.

Work Location:	MP 80.25 > West
Scope of Work:	Tree Trimming Mt Joy Station



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5. Identifies following information for outage:

- Person requesting outage
- Day and date
- Duration
- Is outage daily or continuous
- Restoration time if needed to return for emergency
- Voltage levels
- Name and number of contact if follow up information if needed.

Requested by:	Adam Glick		
Day(s) work to be done:	☒ MONDAY ☒ TUESDAY ☒ WEDNESDAY ☒ THURSDAY ☐ FRIDAY ☐ SATURDAY ☐ SUNDAY		
Date(s):	3.26.18 - 3.29.18	Start time: 6:30 AM End time: 2:30 PM	☒ DAILY ☐ CONTINUOUS
Emergency restoration time:	30 minutes	Amtrak contact:	Sean Montgomery
Voltage level:	6.9 kV, 12 kV, 138 kV	Contact #:	267-322-

6. Determines following spending allocation for work:

- Core budget
- Capital project
- Reimbursable (Utility, foreign railroad etc.)

7. Recognizes cost center and gang performing work.

Type of work:	☐ CORE ☒ CAPITAL ☐ REIMBURSABLE				
Cost Cent:	3978	Gang:	J044	Project # (if other than core):	975968



8. Identifies any "Special Switching" or "Ground Locations" for outage.

Special switching and/or ground locations:

No. 170 "G.'s" (for Grounds) to be checked closed at Sub 70 Rheems

9. Enters following information:

- Date outage request was received
- Status of outage request
- Who determined status of outage request
- Notes or remarks pertaining to outage request

For Load Dispatcher use only

Date received: 3/25/2018

Status:

☒ APPROVED

☐ DENIED

☐ CANCELLED

☐ CONDITIONAL APPROVAL

By: Don Moore

Notes/ remarks:

21 (138 kV) Tie Switch at S72 Harrisburg needs to be closed prior to issuing.



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ELECTRIC TRACTION PLANNED OUTAGE APPLICATION

Type:	☐ AIR BREAK /GROUND SWITCH ☐ BREAKER ☐ BUS SECTION ☐ CABLE ☒ CATENARY ☐ CONVERTER STATION ☐ HEATER STATION ☐ HIGH SIDE SWITCH ☐ 138 kV ROOF BUS SECTION ☐ SIGNAL BREAKER ☒ SIGNAL LINE ☐ SIGNAL MACHINE ☐ "T" DISC. SWITCH ☐ THIRD RAIL ☒ TRANSMISSION ☐ TRANSFORMER			
Outage(s) Requested:	7001 trolley between the 11E switch at Rheems, Sub 69 Landisville, and section breaks 6900v signal power line between the east switches at P1228 location and the west switches at P1209 location No. 170 138kv transmission line between Sub 70 Rheems and Sub 69 Landisville			
Work Location:	MP 80.25 > West			
Scope of Work:	Tree Trimming Mt Joy Station			
Requested by:	Adam Glick			
Day(s) work to be done:	☒ MONDAY ☒ TUESDAY ☒ WEDNESDAY ☒ THURSDAY ☐ FRIDAY ☐ SATURDAY ☐ SUNDAY			
Date(s):	3.26.18 - 3.29.18	Start time: 6:30 AM	☒ DAILY ☐ CONTINUOUS	
		End time: 2:30 PM		
Emergency restoration time:	30 minutes	Amtrak contact:	Sean Montgomery	
Voltage level:	6.9 kV, 12 kV, 138 kV	Contact #:	267-322-	
Type of work:	☐ CORE ☒ CAPITAL ☐ REIMBURSABLE			
Cost Cent: 3978	Gang: J044	Project # (if other than core): 975968		
Special switching and/or ground locations:				
No. 170 "G.'s" (for Grounds) to be checked closed at Sub 70 Rheems				
For Load Dispatcher use only				
Date received:	3/25/2018			
Status:	☒ APPROVED ☐ DENIED ☐ CANCELLED ☐ CONDITIONAL APPROVAL			
By:	Don Moore			
Notes/ remarks:				
21 (138 kV) Tie Switch at S72 Harrisburg needs to be closed prior to issuing.				

Figure FAR 5-2. Completed Planned Outage Application Form

**FAR-6 MAINTAINING OUTAGE SCHEDULER****1.0 INTRODUCTION**

The Outage Scheduler in Microsoft Outlook Calendar is the tool used by the Power Director to record future planned outages. The purpose of the calendar is to show who is scheduled to work where, why, the nature of the work, etc. The information for the planned outage is provided by the schedulers (Electric Traction field personnel, Utility etc.) and is referred to when planning the day or week to confirm a scheduled outage. This allows the Power Director to plan for scheduled work as the shift starts. The calendar can be viewed in a day, week or month format.

The Outage Scheduler enable the Power Director to identify requests which may require advanced or additional resources such as switching support personnel, planned signal interruptions etc. Additionally, the Power Director will be able to better identify requests which may conflict, are inaccurate, or are not able to be granted due to system configuration. The Power Director will relay this information to the scheduler so that they can re-evaluate the request. An operational planning analysis on all outage requests will be done prior to being approved to ensure Amtrak's traction power system's integrity, stability and configuration is maintained, it is therefore important that this calendar be maintained properly. Any outage request that could jeopardize the reliability of Amtrak's traction power system will be denied.

2.0 TASK OBJECTIVE

Enter all appropriate information into Outage Scheduler to ensure a complete and accurate record is maintained for any planned outages scheduled for future dates. Notify all parties involved once outage status has been determined or changed.

3.0 RECOMMENDED CONDITIONS

This task should be performed as soon as a planned or scheduled outage is requested.

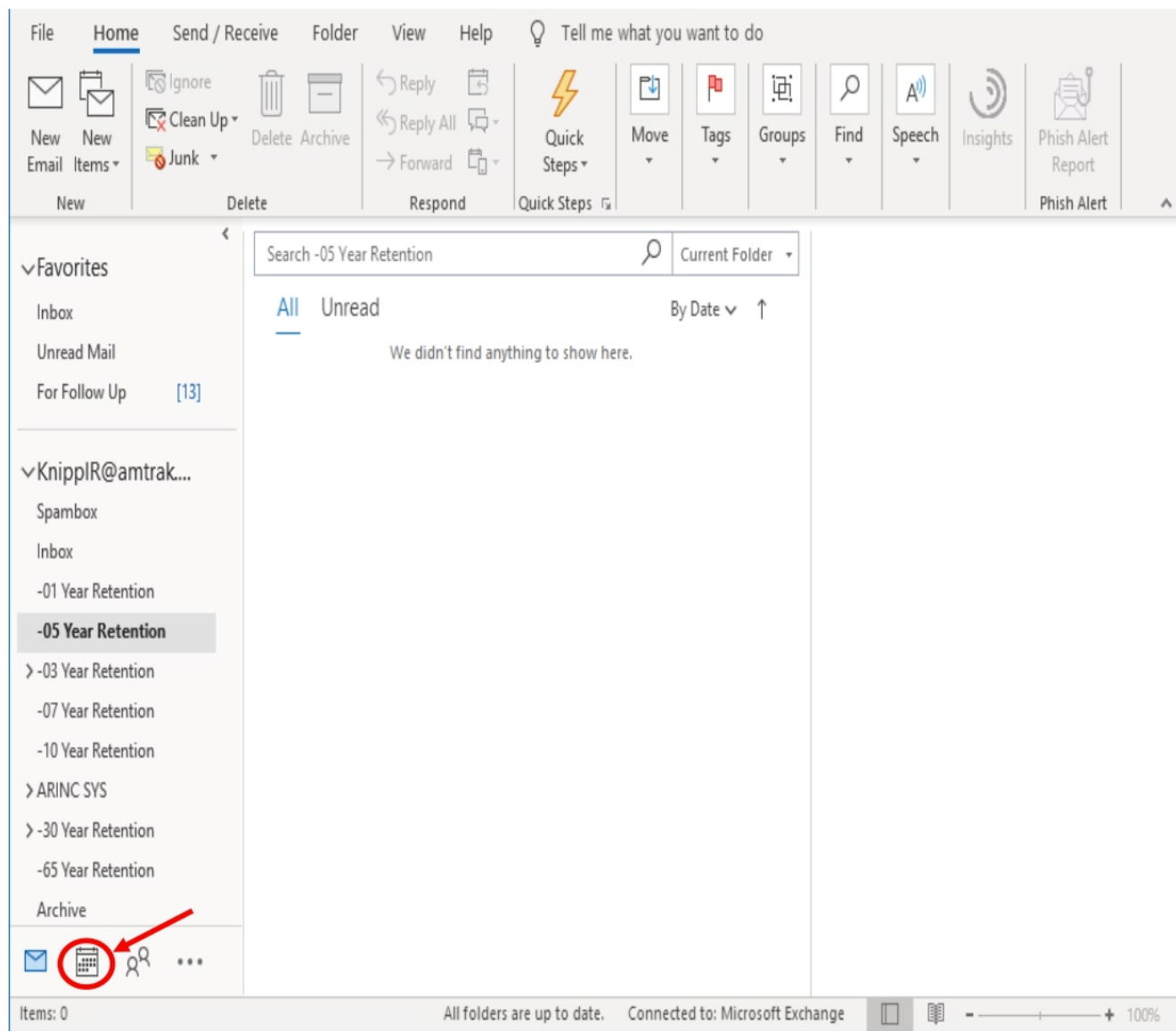
4.0 REFERENCES

- Microsoft Outlook Mail
- Power Director Outage Scheduler in Microsoft Outlook Calendar
- ET Planned Outage Application Form.xls
- Power Director Contact List
- Appendix A. Glossary
- Appendix B. Abbreviations & Acronyms

5.0 POWER DIRECTOR ACTION

To enter a planned or scheduled outage, the **Power Director**:

1. **Opens** Microsoft Outlook.
2. **Selects** "Calendar" at bottom.





3. **Selects** Outage Scheduler for relevant Operating Zone.

The screenshot displays the Microsoft Outlook calendar application. The left sidebar shows a list of calendars, with 'Wilmington CETC' selected and highlighted by a red circle. Below it, several other calendars are listed, including 'Zone 4 Po...', 'Zone 5 Po...', 'Zone 6 Po...', and 'Zone 8 Po...'. The main calendar view shows a grid for July and August 2020, with the date '9' highlighted in blue. The top ribbon shows 'Home' and 'Send / Receive' tabs. The bottom status bar indicates 'Items: 0' and 'Connected to: Microsoft Exchange'.

4. **Double clicks** date of outage.

- Single day outages that extend several days must be entered on a singular day basis unless outage is continuous.

The screenshot displays the Power Director Outage Scheduler interface. The main calendar view shows July 2020. A red box highlights the date July 9th, which is a Thursday. A red arrow points to the right side of the red box. The interface includes a ribbon with tabs like File, Home, Send / Receive, Folder, View, and Help. The Home tab is active, showing options for New Appointment, New Meeting, and New Items. The calendar view shows days of the week and dates. The left sidebar shows a list of calendars, including 'Zone 4 Po...' and 'Zone 5 Po...'. The bottom status bar indicates 'All folders are up to date' and 'Connected to: Microsoft Exchange'.



5. Enters outage and location of work.

- Include work to be performed under location.

File Event Scheduling Assistant Insert Format Text Review Help Tell me what you want to do

Delete Calendar Forward Teams Meeting Meeting Notes Invite Attendees Show As: Free Reminder: 18 hours Recurrence Categorize Private High Importance Low Importance Dictate Insights View Templates My Templates

Save & Close Title 6900v signal power line P1100E - Sub 69 Landisville

Start time Thu 7/9/2020 12:00 AM All day Time zones

End time Thu 7/9/2020 12:00 AM Make Recurring

Location MP 74.18 (P1090 Linkage Repair)

6. Unchecks all day event.

File Appointment Scheduling Assistant Insert Format Text Review Help Tell me what you want to do

Delete Calendar Forward Teams Meeting Meeting Notes Invite Attendees Show As: Busy Reminder: 15 minutes Recurrence Categorize Private High Importance Low Importance Dictate Insights View Templates My Templates

Save & Close Title 6900v signal power line P1100E - Sub 69 Landisville

Start time Thu 7/9/2020 8:00 AM All day Time zones

End time Thu 7/9/2020 8:30 AM Make Recurring

Location MP 74.18 (P1090 Linkage Repair)

7. Adds duration of outage.

- Start time
- End time

File Appointment Scheduling Assistant Insert Format Text Review Help Tell me what you want to do

Delete Calendar Forward Teams Meeting Meeting Notes Invite Attendees Show As: Busy Reminder: 15 minutes Recurrence Categorize Private High Importance Low Importance Dictate Insights View Templates My Templates

Save & Close Title 6900v signal power line P1100E - Sub 69 Landisville

Start time Thu 7/9/2020 12:00 AM All day Time zones

End time Thu 7/9/2020 6:00 AM Make Recurring

Location MP 74.18 (P1090 Linkage Repair)

8. Attaches outage request form.

- If outage request is not in required format (Utilities etc.), please add info that was provided.

The screenshot shows the 'Appointment' form in Power Director. The title is '6900v signal power line P1100E - Sub 69 Landisville'. The start time is 'Thu 7/9/2020 12:00 AM' and the end time is 'Thu 7/9/2020 6:00 AM'. The location is 'MP 74.18 (P1090 Linkage Repair)'. A red circle highlights the 'ET Planned Outage Application Form P1090.xlsx' file (41 KB) attached to the appointment.

9. Saves outage information prior to closing.

The screenshot shows the 'Appointment' form in Power Director. The title is '6900v signal power line P1100E - Sub 69 Landisville'. The start time is 'Thu 7/9/2020 12:00 AM' and the end time is 'Thu 7/9/2020 6:00 AM'. The location is 'MP 74.18 (P1090 Linkage Repair)'. A red circle highlights the 'Save & Close' button in the top left corner of the form.

10. Checks accuracy for outage by placing mouse over outage.

The screenshot shows the Power Director calendar view for July 2020. The calendar displays the dates from Sunday, June 28 to Saturday, July 4. A red circle highlights the outage appointment for Thursday, July 9th. The appointment details are as follows:

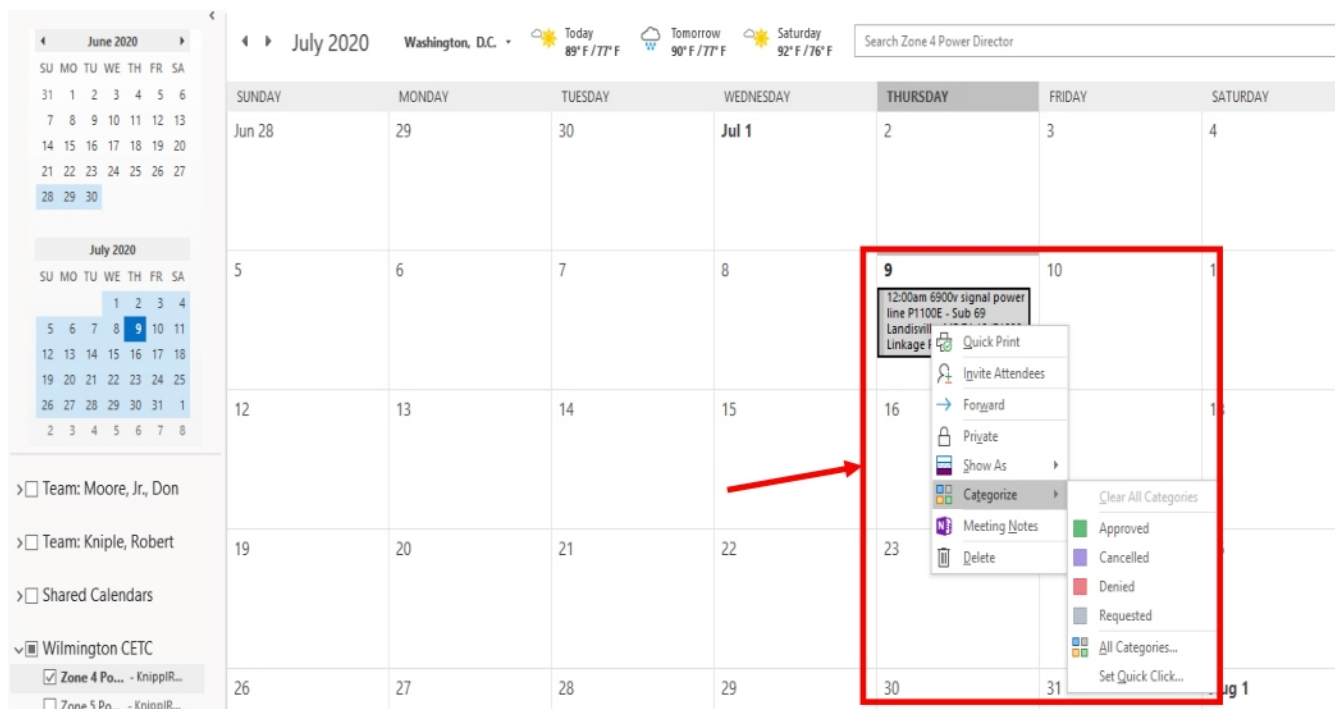
Day	Start	End	Location	Reminder
Thursday, July 9th	12:00am	6:00 AM	MP 74.18 (P1090 Linkage Repair)	None



11. If outage status is determined after entering:

11a. **Categorizes** outage status by right clicking on outage.

-  Approved
-  Denied
-  Cancelled
- Any outage that is not color coded with above colors shall be considered in a pending review state.



12. **Notifies** all parties involved (Field personnel, Utility etc.) once outage status has been determined or changed.

-  Approved
-  Denied
-  Cancelled

ATTENTION

The Power Director on duty is responsible for following up on outages that were received prior to his tour of duty to ensure all outages have been accurately entered in the appropriate Power Director Outage Scheduler.

**FAR-7 PERFORMING A POWER DIRECTOR CALLOUT****1.0 INTRODUCTION**

On occasion, the Power Director on duty will be required to perform a callout to fill a vacancy for a Power Director shift. A callout could range from a routine occurrence such as a Power Director mark off, to a more complex event, such as an extra Power Director to assist with approaching weather. The Callout sheet, as shown in Figure FAR 7-1, is used to document that event.

Callouts are to be performed in seniority order in accordance with the ATDA Labor Agreement. All callouts will be conducted over a recorded phone line. No personal electronic device will be utilized while performing a callout. Figure FAR 7-2 shows a completed callout sheet.

2.0 TASK OBJECTIVE

Perform a callout by entering all appropriate information into Callout sheet, to ensure a complete and accurate record is maintained of all Power Director callouts being performed. Notify immediate supervisor when callout is completed.

3.0 RECOMMENDED CONDITIONS

This task should be performed after it has been determined that a callout is required.

4.0 REFERENCES

- PD Callout Sheet.xlsm
- Microsoft Outlook Mail
- Appendix B. Abbreviations & Acronyms
- Appendix C. Wilmington Power Director Office Seniority Roster



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POWER DIRECTOR CALLOUT SHEET

Date: 10/1/2020 9:16

Callout Performed By :

Zone / Shift Vacancy:

Reason For Callout:

Power Director Name	Phone Number	Zone Qualifications				Call Details					
		4	5	6	8	Callout Accepted?		Message Left	No Answer	Time	Additional Comments
						Yes	No				
Cross Jr., B.A.	(302) [REDACTED]	✓	✓	✓	✓	☐	☐	☐	☐		
McArdle, P. J.	(302) [REDACTED]	✓	✓	✓	✓	☐	☐	☐	☐		
Archdeacon, M.	(610) [REDACTED]	✓	✓	✓		☐	☐	☐	☐		
Walker, A.	(443) [REDACTED]	✓	✓	✓	✓	☐	☐	☐	☐		
Donmoyer, B.	(717) [REDACTED]	✓	✓	✓	✓	☐	☐	☐	☐		
Strange, I.	(302) [REDACTED]	✓	✓	✓	✓	☐	☐	☐	☐		
Polk, C.	(410) [REDACTED]	✓	✓	✓	✓	☐	☐	☐	☐		
Cooper, R.	(302) [REDACTED]	✓	✓	✓	✓	☐	☐	☐	☐		
McClintock, C.	(610) [REDACTED]	✓	✓	✓	✓	☐	☐	☐	☐		
Serino, E.	(610) [REDACTED]	✓	✓	✓	✓	☐	☐	☐	☐		
May, A. *	(267) [REDACTED]	✓	✓	✓	✓	☐	☐	☐	☐		
Nacke, J.	(443) [REDACTED]	✓	✓	✓	✓	☐	☐	☐	☐		
DiCampello, M.	(215) [REDACTED]	✓	✓	✓	✓	☐	☐	☐	☐		
Curry, R.	(302) [REDACTED]	✓	✓	✓	✓	☐	☐	☐	☐		
Fox, A.	(816) [REDACTED]	✓	✓	✓	✓	☐	☐	☐	☐		
Rocque, M.	(518) [REDACTED]	✓	✓	✓	✓	☐	☐	☐	☐		
Stephen, R. *	(856) [REDACTED]	✓	✓	✓	✓	☐	☐	☐	☐		
Drew, J. *	(484) [REDACTED]	✓	✓	✓	✓	☐	☐	☐	☐		
Cross III, B	(302) [REDACTED]	✓	✓	✓	✓	☐	☐	☐	☐		
McCarthy, B. *	(856) [REDACTED]	✓	✓	✓	✓	☐	☐	☐	☐		
Harris, A. ***	(856) [REDACTED]	✓	✓	✓		☐	☐	☐	☐		

* Extra Employees are Called first is available at straight time. If in question contact R. Kniple

*** Special Duty, Call if needed

Figure FAR 7-1. Blank Power Director Callout Sheet



5.0 POWER DIRECTOR ACTION

To perform a callout, the **Power Director**:

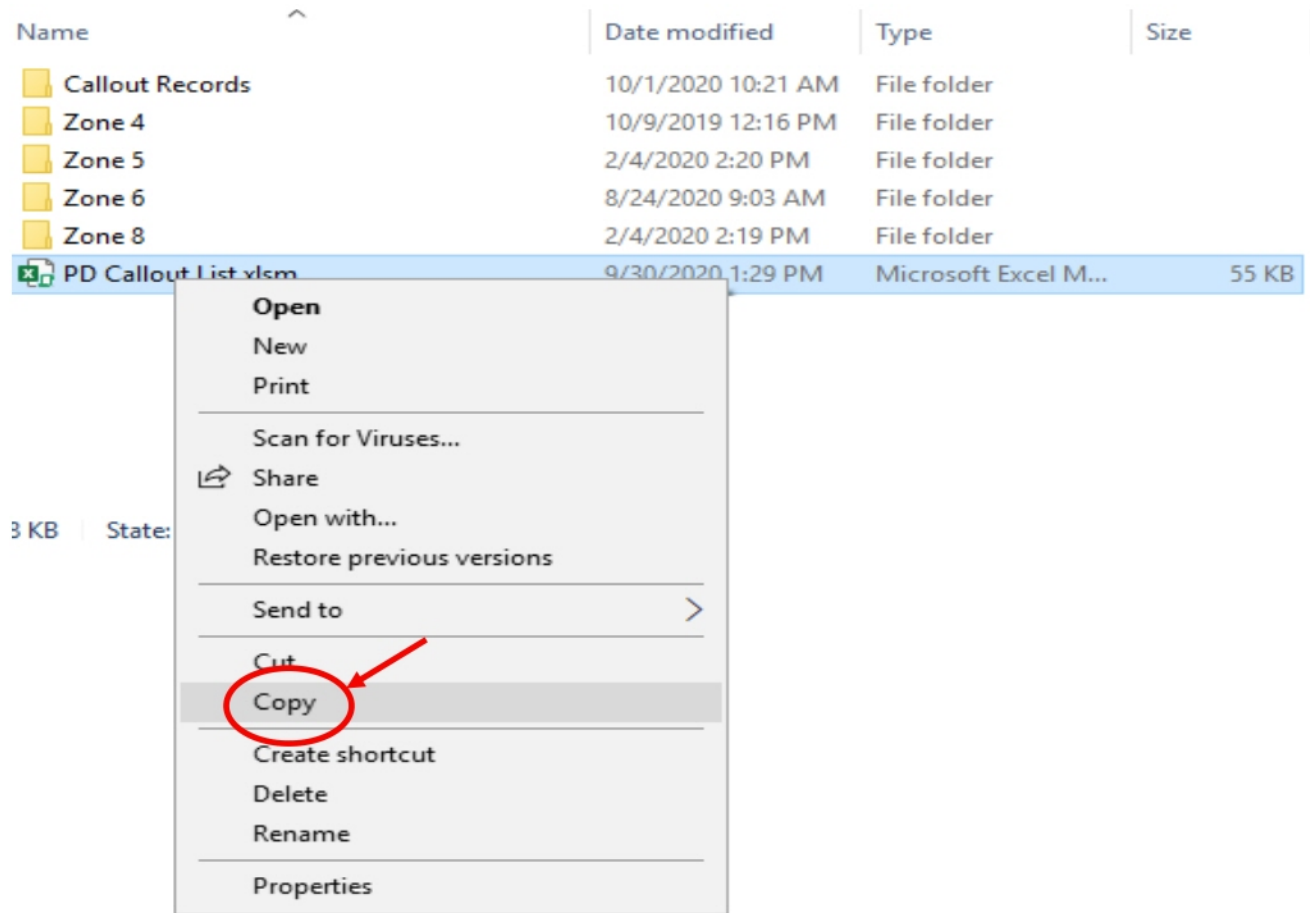
1. **Opens** "WilmingtonPDOOffice" folder in "S" drive.

Name	Date modified	Type	Size
WilMechPublic	1/30/2018 2:42 PM	File folder	
WILMECHUSAT	1/30/2018 2:42 PM	File folder	
Wilmington Shops	1/30/2018 2:42 PM	File folder	
WilmingtonPD_ShiftTurnover	2/6/2019 1:54 PM	File folder	
WilmingtonPD_Training	3/29/2019 1:54 PM	File folder	
WilmingtonPDOOffice	7/17/2018 10:09 AM	File folder	
WilmMechDesign	1/30/2018 2:42 PM	File folder	
WilmMechDesign2	1/30/2018 2:42 PM	File folder	
WilmMechEquipDrawings	1/30/2018 2:43 PM	File folder	
WilmMechSpecsStdSMP	1/30/2018 2:42 PM	File folder	
WilmTeam	1/30/2018 2:42 PM	File folder	
WilRevProtect	1/30/2018 2:43 PM	File folder	

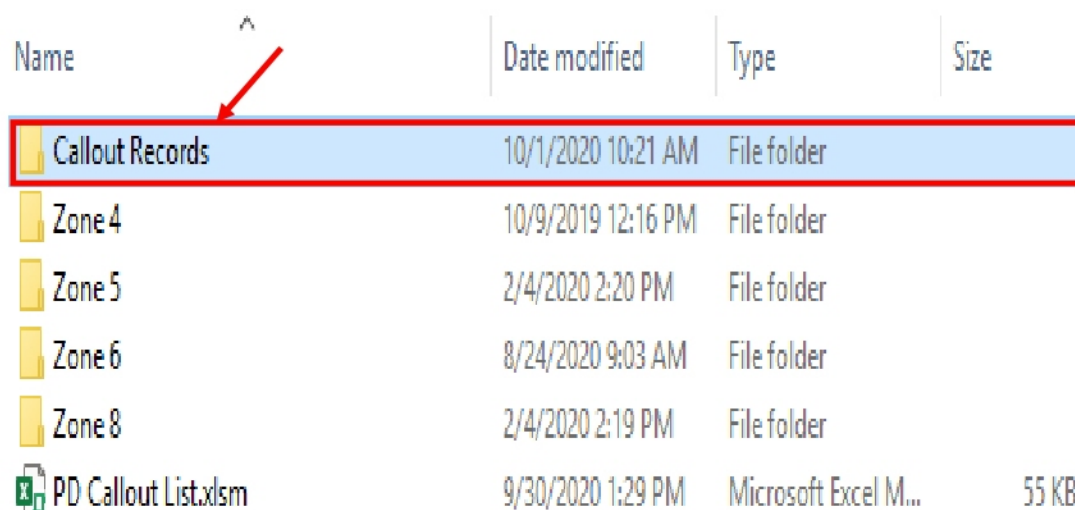
2. **Opens** "Callout Lists" folder.

Name	Date modified	Type	Size
Callout Lists	9/17/2020 7:50 AM	File folder	
Converter Station Manuals	6/23/2020 10:28 AM	File folder	
ET Qualification Lists	6/30/2020 10:24 AM	File folder	
Office Memos and Rule Books	10/1/2020 7:17 AM	File folder	
Operating Agreements	7/31/2019 12:22 PM	File folder	
Vacation Request	9/30/2020 8:05 AM	File folder	
Bid_Sheet.pdf	3/1/2019 7:21 AM	Adobe Acrobat D...	51 KB
Local Control Log.pdf	9/18/2020 2:42 PM	Adobe Acrobat D...	60 KB
NEC661template.doc	12/29/2017 9:35 AM	Microsoft Word 9...	136 KB
PD Sign In Sheet.pdf	3/31/2020 7:59 AM	Adobe Acrobat D...	97 KB

3. **Right clicks** on PD Callout List.xlsm
4. **Selects** "Copy" from action window.



5. **Opens** "Callout Records" folder.





6. **Opens** "Zone" folder for callout being performed.

Name	Date modified	Type	Size
Zone 4	10/1/2020 10:49 AM	File folder	
Zone 5	10/1/2020 10:48 AM	File folder	
Zone 6	10/1/2020 10:48 AM	File folder	
Zone 8	10/1/2020 10:48 AM	File folder	

7. **Right Clicks** mouse.

8. **Selects** "Paste" from window.

Name	Date modified	Type	Size
09..13.20-PD Callout List.xlsm	9/30/2020 1:29 PM	Microsoft Excel M...	55 KB
09..24.20-PD Callout List.xlsm	9/30/2020 1:29 PM	Microsoft Excel M...	55 KB
09..28.20-PD Callout List.xlsm	9/30/2020 1:29 PM	Microsoft Excel M...	55 KB

View	>
Sort by	>
Group by	>
Refresh	
Customize this folder...	
Paste	
Paste shortcut	
New	>
Properties	

9. **Renames** PD Callout List.xlsm file by adding "callout date".

Name	Date modified	Type	Size
09..13.20-PD Callout List.xlsm	9/30/2020 1:29 PM	Microsoft Excel M...	55 KB
09..24.20-PD Callout List.xlsm	9/30/2020 1:29 PM	Microsoft Excel M...	55 KB
09..28.20-PD Callout List.xlsm	9/30/2020 1:29 PM	Microsoft Excel M...	55 KB
10.01.20-PD Callout List.xlsm	9/30/2020 1:29 PM	Microsoft Excel M...	55 KB



10. **Opens** PD Callout List.xlsm.

11. **Enters** following information:

- Date callout started
- Power Director performing callout
- Zone and shift vacancy being filled
- Reason for vacancy

POWER DIRECTOR CALLOUT SHEET

Date: 10/1/2020 12:37

Callout Performed By: David Wech

Zone / Shift Vacancy: Zone 4 / 7AM-3PM

Reason For Callout: Mark Off

Power Director Name	Phone Number	Zone				Call Details				
		Qualifications				Callout Accepted?		Message	No	Time
		4	5	6	8	Yes	No	Left	Answer	
Cross Jr., B.A.	(302) [REDACTED]	✓	✓	✓	✓	☐	☐	☐	☐	
McArdle, P. J.	(302)	✓	✓	✓	✓	☐	☐	☐	☐	
Archdeacon, M.	(610) [REDACTED]	✓	✓	✓		☐	☐	☐	☐	
Walker, A.	(443)	✓	✓	✓	✓	☐	☐	☐	☐	

12. **Performs** callout by calling names listed on sheet.

- Names are listed in seniority order as per ATDA Power Director roster.
- Extra board Power Directors are called first, when available, in seniority order.
- Special duty Power Directors are called last.
- Zone qualifications are listed for each Power Director.

ATTENTION

Contact immediate supervisor for further interpretation if assistance is needed to determine a Power Director's availability for vacancy.



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13. **Provides** details of call by checking one of following:

- Yes- callout accepted
- No- declined vacancy
- Message Left
- No Answer

14. **Writes** time call was placed.

15. **Enters** any additional comments.

POWER DIRECTOR CALLOUT SHEET

Date: 10/1/2020 12:52

Callout Performed By : **David Wech**

Zone / Shift Vacancy: **Zone 4 / 7AM-3PM**

Reason For Callout: **Mark Off**

Power Director Name	Phone Number	Zone				Call Details					
		Qualifications				Callout Accepted?		Message Left	No Answer	Time	Additional Comments
		4	5	6	8	Yes	No				
Cross Jr., B.A.	(302)	✓	✓	✓	✓	☐	☐	☐	☐		Unavailable
McArdle, P. J.	(302)	✓	✓	✓	✓	☐	☐	☒	☒	11:15PM	
Archdeacon, M.	(610)	✓	✓	✓		☒	☐	☐	☐	11:25PM	
Walker, A.	(443)	✓	✓	✓	✓	☐	☐	☐	☐		

16. If callout is completed.

16a. **Saves** document prior to closing.

ATTENTION

When the vacancy has been filled, the Power Director on duty will email completed callout sheet to immediate supervisor.

Email Subject will include date, zone, and shift vacancy.

Example: "Callout for 10.01.20, Zone 4, 7am to 3pm"



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17. If call back from senior Power Director takes place:

17a. **Enters** time under comments.

17b. **Notifies** original acceptor that a senior Power Director has accepted vacancy.

POWER DIRECTOR CALLOUT SHEET

Date: 10/1/2020 13:31

Callout Performed By : David Wech

Zone / Shift Vacancy: Zone 4 / 7AM-3PM

Reason For Callout: Mark Off

Power Director Name	Phone Number	Zone Qualifications				Call Details					
		4	5	6	8	Callout Accepted?		Message Left	No Answer	Time	Additional Comments
						Yes	No				
Cross Jr., B.A.	(302)	✓	✓	✓	✓	☐	☐	☐	☐		Unavailable
McArdle, P. J.	(302)	✓	✓	✓	✓	☒	☐	☒	☒	11:15PM	Accepted 11:50PM
Archdeacon, M.	(610)	✓	✓	✓		☒	☐	☐	☐	11:25PM	
Walker, A.	(443)	✓	✓	✓	✓	☐	☐	☐	☐		
Donmoyer, B.	(717)	✓	✓	✓	✓	☐	☐	☐	☐		
Strange, I.	(302)	✓	✓	✓	✓	☐	☐	☐	☐		

18. If callout is completed and shift still vacant.

18a. **Calls** Special Duty Power Director.

May, A. *	(267)	✓	✓	✓	✓	☐	☐	☐	☐		
Nacke, J.	(443)	✓	✓	✓	✓	☐	☐	☐	☐		
DiCampello, M.	(215)	✓	✓	✓	✓	☐	☐	☐	☐		
Curry, R.	(302)	✓	✓	✓	✓	☐	☐	☐	☐		
Fox, A.	(816)	✓	✓	✓	✓	☐	☐	☐	☐		
Rocque, M.	(518)	✓	✓	✓	✓	☐	☐	☐	☐		
Stephen, R. *	(856)	✓	✓	✓	✓	☐	☐	☐	☐		
Drew, J. *	(484)	✓	✓	✓	✓	☐	☐	☐	☐		
Cross III, B	(302)	✓	✓	✓	✓	☐	☐	☐	☐		
McCarthy, B. *	(856)	✓	✓	✓	✓	☐	☐	☐	☐		
Harris, A. ***	(856)	✓	✓	✓		☐	☐	☐	☐		

* Extra Employees are Called first is available at straight time. If in question contact R. Kniple

*** Special Duty, Call if needed



POWER DIRECTOR OPERATING GUIDELINES

FAR-7 Performing a Power Director Callout

Task Outline

25-FOI-00546

00000004203

"UNCLASSIFIED"

8/21/2025

POWER DIRECTOR CALLOUT SHEET

Date: 10/1/2020 13:49

Callout Performed By: David Wech

Zone / Shift Vacancy: Zone 4 / 7AM-3PM

Reason For Callout: Mark Off

Power Director Name	Phone Number	Quannications				Call Details					
						Callout Accepted?		Message Left	No Answer	Time	Additional Comments
		4	5	6	8	Yes	No				
Cross Jr., B.A.	(302) [REDACTED]	✓	✓	✓	✓	☐	☐	☐	☐		Unavailable
McArdle, P. J.	(302) [REDACTED]	✓	✓	✓	✓	☒	☐	☒	☒	11:15PM	Accepted 11:50PM
Archdeacon, M.	(610) [REDACTED]	✓	✓	✓		☒	☐	☐	☐	11:25PM	
Walker, A.	(443) [REDACTED]	✓	✓	✓	✓	☐	☐	☐	☐		
Donmoyer, B.	(717) [REDACTED]	✓	✓	✓	✓	☐	☐	☐	☐		
Strange, I.	(302) [REDACTED]	✓	✓	✓	✓	☐	☐	☐	☐		
Polk, C.	(410) [REDACTED]	✓	✓	✓	✓	☐	☐	☐	☐		
Cooper, R.	(302) [REDACTED]	✓	✓	✓	✓	☐	☐	☐	☐		
McClintock, C.	(610) [REDACTED]	✓	✓	✓	✓	☐	☐	☐	☐		
Serino, E.	(610) [REDACTED]	✓	✓	✓	✓	☐	☐	☐	☐		
May, A. *	(267) [REDACTED]	✓	✓	✓	✓	☐	☒	☐	☐		
Nacke, J.	(443) [REDACTED]	✓	✓	✓	✓	☐	☐	☐	☐		
DiCampello, M.	(215) [REDACTED]	✓	✓	✓	✓	☐	☐	☐	☐		
Curry, R.	(302) [REDACTED]	✓	✓	✓	✓	☐	☐	☐	☐		
Fox, A.	(816) [REDACTED]	✓	✓	✓	✓	☐	☐	☐	☐		
Rocque, M.	(518) [REDACTED]	✓	✓	✓	✓	☐	☐	☐	☐		
Stephen, R. *	(856) [REDACTED]	✓	✓	✓	✓	☐	☐	☐	☐		Unavailable
Drew, J. *	(484) [REDACTED]	✓	✓	✓	✓	☐	☐	☐	☐		Unavailable
Cross III, B	(302) [REDACTED]	✓	✓	✓	✓	☐	☐	☐	☐		
McCarthy, B. *	(856) [REDACTED]	✓	✓	✓	✓	☐	☐	☐	☐		Unavailable
Harris, A. ***	(856) [REDACTED]	✓	✓	✓		☐	☐	☐	☐		

* Extra Employees are Called first is available at straight time. If in question contact R. Kniple

*** Special Duty, Call if needed

Figure FAR 7-2. Completed Power Director Callout Sheet

**FAR-8 PERFORMING A FIELD PERSONNEL CALLOUT****1.0 INTRODUCTION**

On occasion, the Power Director on duty will be required to perform a callout for field personnel to respond to an abnormal condition or railroad emergency. In addition, callouts may be performed to fill a vacancy in the event of a field markoff. The scope of the callout is determined by the appropriate division manager / supervisor based on their response plan. The Callout sheet, as shown in Figure FAR 8-1, is the form utilized to document that event.

Callouts are to be performed as determined by division management / supervision. All callouts will be done over a recorded phone line. No personal electronic device will be used while performing a callout. Figure FAR 8-2 shows a completed callout sheet.

2.0 TASK OBJECTIVE

Perform a field callout by entering all appropriate information into the Callout sheet, to ensure a complete and accurate record is maintained of all callouts being performed. Notify division manager / supervisor when callout is completed.

3.0 RECOMMENDED CONDITIONS

This task should be performed after it has been determined that a callout is required as determined by division management / supervision.

4.0 REFERENCES

- Division Callout Lists
- Microsoft Outlook Mail
- Appendix B. Abbreviations & Acronyms



POWER DIRECTOR OPERATING GUIDELINES

FAR-8 Performing a Field Personnel Callout

Task Outline

25-FOI-00546

00000004203

"UNCLASSIFIED"

8/21/2025

ELECTRIC TRACTION DEPARTMENT

LIST No. : 21 CALL OUT SHEET PD ZONE : 5

WILMINGTON LINE

Rev. Date : 24-Mar-22 4:10 PM Call Date: _____

Power Director 1 - (12 - 08) _____ Remark: _____

Power Director 2 - (08 - 04) _____

Power Director 3 - (04 - 12) _____

Territory : RAGAN MP 29.3 TO DARBY CREEK MP 6.3

Rank	Employee Name	Phone No.	Position	Yes	No	No Ans	Time	Remark
16	Thomas W illiam A.	302	FOREMAN					
63	Wright, Scott	856	GANG FOREMAN					
182	Hodgson, Joshua	610	GANG FOREMAN-N					
15	Greco, Joseph	302	LINEMAN HRO					
110	Anderson, Ricky J.	302	LINEMAN CDL					
125	Ridgway, Brian	856	LINEMAN CDL					
128	Damico, Mark	610	LINEMAN CDL					
164	Cronauer, Jason	610	LINEMAN HRO-N					
215	Fritz, Megan C.	267	LINEMAN CDL					
217	Swarter, MatthewJ.	302	LINEMAN CDL-N					
220	Brooks, Steven S.	443	LINEMAN CDL-N					
224	Hudson, Mark R.	302	LINEMAN CDL-N					
229	Mitchell, Matthew R.	302	LINEMAN HRO-N					
233	Vayo, Brandon	302	LINEMAN CDL-N					
252	Delpiano, Frank	302	LINEMAN CDL-N					
257	Spina, Vincent	610	LINEMAN CDL-N					
298	Perrey, Raymond	215	TRAINEE					
299	Manire, Christopher	856	TRAINEE					
300	McCullom, Kyle	484	TRAINEE					

Figure FAR 8-1. Blank Field Employee Callout Sheet

**5.0 POWER DIRECTOR ACTION**

To perform a callout, the **Power Director**:

1. **Opens** "WilmingtonPDOOffice" folder in "S" drive.

Name	Date modified	Type	Size
WilMechPublic	1/30/2018 2:42 PM	File folder	
WILMECHUSAT	1/30/2018 2:42 PM	File folder	
Wilmington Shops	1/30/2018 2:42 PM	File folder	
WilmingtonPD_ShiftTurnover	2/6/2019 1:54 PM	File folder	
WilmingtonPD_Training	3/29/2019 1:54 PM	File folder	
WilmingtonPDOOffice	7/17/2018 10:09 AM	File folder	
WilmMechDesign	1/30/2018 2:42 PM	File folder	
WilmMechDesign2	1/30/2018 2:42 PM	File folder	
WilmMechEquipDrawings	1/30/2018 2:43 PM	File folder	
WilmMechSpecsStdSMP	1/30/2018 2:42 PM	File folder	
WilmTeam	1/30/2018 2:42 PM	File folder	
WilRevProtect	1/30/2018 2:43 PM	File folder	

ATTENTION

Print out revised copies of callout sheets and place in folder on desk in event computer system is unavailable. Remove older versions of callout sheets from desk.

2. **Opens** "Callout Lists" folder.

Name	Date modified	Type	Size
Callout Lists	9/17/2020 7:50 AM	File folder	
Converter Station Manuals	6/23/2020 10:28 AM	File folder	
ET Qualification Lists	6/30/2020 10:24 AM	File folder	
Office Memos and Rule Books	10/1/2020 7:17 AM	File folder	
Operating Agreements	7/31/2019 12:22 PM	File folder	
Vacation Request	9/30/2020 8:05 AM	File folder	
Bid_Sheet.pdf	3/1/2019 7:21 AM	Adobe Acrobat D...	51 KB
Local Control Log.pdf	9/18/2020 2:42 PM	Adobe Acrobat D...	60 KB
NEC661template.doc	12/29/2017 9:35 AM	Microsoft Word 9...	136 KB
PD Sign In Sheet.pdf	3/31/2020 7:59 AM	Adobe Acrobat D...	97 KB



POWER DIRECTOR OPERATING GUIDELINES

FAR-8 Performing a Field Personnel Callout

Task Outline

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3. **Opens** proper "Zone" folder where callout is being performed.

Name	Date modified	Type	Size
Callout Records	10/7/2020 7:31 AM	File folder	
Zone 4	10/9/2019 12:16 PM	File folder	
Zone 5	2/4/2020 2:20 PM	File folder	
Zone 6	8/24/2020 9:03 AM	File folder	
Zone 8	10/1/2020 1:55 PM	File folder	
PD Callout List.xlsm	9/30/2020 1:29 PM	Microsoft Excel M...	55 KB

4. **Right Clicks** file for headquarters where callout is being performed.

5. **Selects** "Print" from the action window.

Name	Date modified	Type	Size
Perryville.pdf	6/16/2022 1:57 PM	Adobe Acrobat D...	17 KB
Wilmington.pdf	2/24/2022 7:14 PM	Adobe Acrobat D...	18 KB

Open with Adobe Reader X

Open

Print

Share with Skype

Scan with Microsoft Defender...

Share

Open with

Restore previous versions

6. **Enters** following information on printed form:

- Date callout started
- Power Director performing callout
- Reason for callout "Remark".

ELECTRIC TRACTION DEPARTMENT

LIST No. : 21

CALL OUT SHEET

PD ZONE : 5

WILMINGTON LINE

Rev. Date : 24-Mar-22 4:10 PM

Power Director 1 - (12 - 08)

Power Director 2 - (08 - 04)

Power Director 3 - (04 - 12)

M. Chimics

06.29.22

Call Date:

Remark: Per F. Morris, Call-out to: Repair fouling
hanger #1 Track Wilmington Station

Territory : RAGAN MP 29.3 TO DARBY CREEK MP 6.3



POWER DIRECTOR OPERATING GUIDELINES

FAR-8 Performing a Field Personnel Callout

Task Outline

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7. Performs callout by calling names listed on sheet.

- Names are listed in seniority order as per BMW E roster.
- Positions are listed in center column. ("N" indicates night shift)

Rank	Employee Name	Phone No.	Position	Yes	No	No Ans	Time	Remark
16	Thomas William A.	302-250	FOREMAN					
63	Wright, Scott	856-803	GANG FOREMAN	X			10:42A	
182	Hodgson, Joshua	610-314	GANG FOREMAN-N					
15	Greco, Joseph	302-528	LINEMAN HRO	X			10:46A	
110	Anderson, Ricky J.	302-420	LINEMAN CDL		X		10:49A	
125	Ridgway, Brian	856-207	LINEMAN CDL			X	10:52A	Left message
128	Damico, Mark	610-848	LINEMAN CDL		X		10:56A	
164	Cronauer, Jason	610-348	LINEMAN HRO-N	X			10:58A	
215	Fritz, Megan C.	267-616	LINEMAN CDL		X		11:02A	
217	Swarter, Matthew J.	302-540	LINEMAN CDL-N	X			11:06A	

8. Provides details of call by checking one of following:

- Yes- callout accepted
- No- declined vacancy
- No answer

9. Enters time call was placed.

10. Enters any additional comments under "Remark".

Rank	Employee Name	Phone No.	Position	Yes	No	No Ans	Time	Remark
16	Thomas William A.	302-250	FOREMAN					
63	Wright, Scott	856-803	GANG FOREMAN	X			10:42A	
182	Hodgson, Joshua	610-314	GANG FOREMAN-N					
15	Greco, Joseph	302-528	LINEMAN HRO	X			10:46A	
110	Anderson, Ricky J.	302-420	LINEMAN CDL		X		10:49A	
125	Ridgway, Brian	856-207	LINEMAN CDL			X	10:52A	Left message
128	Damico, Mark	610-848	LINEMAN CDL		X		10:56A	
164	Cronauer, Jason	610-348	LINEMAN HRO-N	X			10:58A	
215	Fritz, Megan C.	267-616	LINEMAN CDL		X		11:02A	
217	Swarter, Matthew J.	302-540	LINEMAN CDL-N	X			11:06A	



POWER DIRECTOR OPERATING GUIDELINES

FAR-8 Performing a Field Personnel Callout

Task Outline

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11. **Reports** outcome of callout to requesting Division manager.
12. If callout remains incomplete.
 - 12a. **Awaits** further instruction from requesting manager.
13. **Scans** and **emails** completed callout sheet to responsible ADE.
14. **Retains** completed callout form on Power Director desk as determined by office manager.

ATTENTION

Requesting Division manager will define parameters for callout.

ELECTRIC TRACTION DEPARTMENT

LIST No. : 21 CALL OUT SHEET PD ZONE : 5

WILMINGTON LINE

06.29.22

Rev. Date : 24-Mar-22 4:10 PM Call Date: _____
 Power Director 1 - (12 - 08) _____ Remark: Per F. Morris, Call-out to: Repair fouling
 Power Director 2 - (08 - 04) M. Chimics hanger #1 Track Wilmington Station
 Power Director 3 - (04 - 12) _____

Territory : RAGAN MP 29.3 TO DARBY CREEK MP 6.3

Rank	Employee Name	Phone No.	Position	Yes	No	No Ans	Time	Remark
16	Thomas W illiam A.	302	FOREMAN					
63	Wright, Scott	856	GANG FOREMAN	X			10:42A	
182	Hodgson, Joshua	610	GANG FOREMAN-N					
15	Greco, Joseph	302	LINEMAN HRO	X			10:46A	
110	Anderson, Ricky J.	302	LINEMAN CDL		X		10:49A	
125	Ridgway, Brian	856	LINEMAN CDL			X	10:52A	Left message
128	Damico, Mark	610	LINEMAN CDL		X		10:56A	
164	Cronauer, Jason	610	LINEMAN HRO-N	X			10:58A	
215	Fritz, Megan C.	267	LINEMAN CDL		X		11:02A	
217	Swarter, MatthewJ.	302	LINEMAN CDL-N	X			11:06A	
220	Brooks, Steven S.	443	LINEMAN CDL-N					
224	Hudson, Mark R.	302	LINEMAN CDL-N					
229	Mitchell, Matthew R.	302	LINEMAN HRO-N					
233	Vayo, Brandon	302	LINEMAN CDL-N					
252	Delpiano, Frank	302	LINEMAN CDL-N					
257	Spina, Vincent	610	LINEMAN CDL-N					
298	Perrey, Raymond	215	TRAINEE					
299	Manire, Christopher	856	TRAINEE					
300	McCullom, Kyle	484	TRAINEE					

Figure FAR 8-2. Completed Field Employee Callout Sheet

**FAR-9 MAINTAINING ELECTRICAL WORK PERMIT FORM NEC.85****1.0 INTRODUCTION**

Occasionally, field personnel need to troubleshoot or test secondary circuitry, such as a motor mechanism for a switch or relay work on an apparatus. An electrical Work Permit is utilized for these purposes. The Electrical Work Permit Form (NEC.85) is a legal document from the Power Director to Class "A" field employees when necessary to work on control system, apparatus, or equipment, where personnel are not exposed to energized conductors above 480 volts. The minimum approach distance will be maintained in these situations.

The Electrical Work Permit Form is used to record the description of the electrical work permit, referred to as the body of the work permit. The electrical work permit may include special instructions or operating restrictions as uncoupled, coupled, permission to or talk prior to operating. In addition, permissions are listed as well as all switching, and actions performed under the direction of the Power Director.

The limits of the work to be performed is established by the switching procedures and / or operating restrictions to de-energize an area as defined by the body of the electrical work permit, that is an understanding between the Power Director and the Class "A" field employee. The electrical work permit number is a specific, identifying number assigned to a work permit for tracking purposes. It is imperative that each Power Director fill out the Electrical Work Permit Form in an exact manner so that, after Shift Turnover completion, the incoming Power Director can look at the work permit and determine the status.

Figure FAR 9-1 shows the Electrical Work Permit Form (NEC.85) which includes the electrical work permit request from the Class "A" field employee, permissions, if required, pertaining to the work permit, switching record, issuing, and releasing of the electrical work permit clearance.

2.0 TASK OBJECTIVE

Record all appropriate information, in a neat and legible manner, on the Electrical Work Permit Form (NEC.85) to ensure a complete and accurate record is maintained of all permissions, device operations, and switching orders pertaining to the electrical work permit.

3.0 RECOMMENDED CONDITIONS

This task should be performed during the performance of any of the following:

- Requesting an electrical work permit
- Permissions or notifications pertaining to electrical work permit
- Switching instructions to de-energize or re-energize circuits or apparatus
- Issuing and releasing electrical work permit

4.0 REFERENCES

- Power Director Electrical Work Permit Form (NEC.85)

- SCADA Operating System
- Power Sectionalizing Plate Reference Book
- AMT.2 Electrical Operating Rules & Instructions
- SOI.209 Electrical Work Permit Procedure
- Appendix A. Glossary
- Appendix B. Abbreviations & Acronyms



Electric Traction Power Director Electrical Work Permit Form

Work Permit No: **1** Day: **2** Date: **3** Time Requested: **4** ☐ AM ☐ PM

Apparatus: 5 On account of: 6 Location: 7

Remarks: _____ **8**

Load Dispatcher: 9

Permit No: **10** Notified: **11** ☐ AM ☐ PM Permission: **12** ☐ AM ☐ PM In Effect: **13** ☐ AM ☐ PMTrain Dispatcher/Others: 14Plate: **15** Notified: **16** ☐ AM ☐ PM Permission: **17** ☐ AM ☐ PM[illegible]

Work Permit No: **26** Day: **27** Date: **28** To: **29**

Has permission to work on the following: _____

30

Time effective: 31 ☐ AM ☐ PM Work Permit repeated correctly at: 32 ☐ AM ☐ PM

Power Director: 33
Work Permit Issued (Print/ Sign)

Work Permit No: **34** Day: **35** Date: **36** Employee: **37**

Reports work completed, all personnel clear from following: **38** (read body work permit) **39** ☐ OK ☐ NOT OK for service at: **40** ☐ AM ☐ PM

Power Director: _____ **41**
Work Permit Completed (Print/ Sign)

Load Dispatcher: **42**

Permit No: **43** Notified: **44** ☐ AM ☐ PM Released: **45** ☐ AM ☐ PM Completed: **46** ☐ AM ☐ PMTrain Dispatcher/Others: **47**

Plate: **48** Notified: **49** ☐ AM ☐ PM Released: **50** ☐ AM ☐ PM

NEC-85 (Rev. 07.22)

Amtrak is a registered service mark of the National Railroad Passenger Corporation.

Figure FAR 9-1. Electrical Work Permit Form NEC.85

**5.0 POWER DIRECTOR ACTION**

To enter information on Electrical Work Permit Form (NEC.85), the **Power Director**:

**Electric Traction Power Director Electrical Work Permit Form**

Work Permit No: 1 Day: 2 Date: 3 Time Requested: 4 ☐ AM ☐ PM

Apparatus: 5 On account of: 6 Location: 7

Remarks: 8

Figure FAR 9-2. Work Permit Request Section of Electrical Work Permit Form NEC.85

Refer to "work permit request section" of NEC.85 form, which consists of spaces 1-8 in Figure FAR 9-2 above.

1. **Enters** "work permit number".
2. **Writes** "day" work permit was requested.
3. **Writes** "date" work permit was requested.
4. **Adds** "time" work permit was requested. Adds check mark for AM or PM.
 - Entries on lines 2, 3 and 4 are when Class "A" employee makes official work permit request.
5. **Identifies** "apparatus" involved in work permit request such as:

• RTU cabinet	• 100 cycle signal machine
• 116,116G motor mechanism	• #2 XFMR
• Batteries	• 1402 trolley circuit breaker
6. **Provides** reason "on account of" for work permit such as:

• Replace card	• Relays
• Troubleshooting	• Maintenance
• Replacement	• FEOT Testing
7. **Enters** "location" where work will be performed such as:

• Sub 09 Zoo	• Sub 19 North Point
• Richmond SFC station	• Bacon Interlocking
8. **Provides** "remarks" pertaining to work permit such as:

• Clear time	• Supervisor/ Foreman on location
• Contact numbers	• Additional information pertaining to work permit



POWER DIRECTOR OPERATING GUIDELINES

FAR-9 Maintaining Electrical Work Permit Form NEC.85

Task Outline

25-FOI-00546

00000004203

"UNCLASSIFIED"

8/21/2025

Load Dispatcher: 9

Permit No: 10 Notified: 11 ☐ AM ☐ PM Permission: 12 ☐ AM ☐ PM In Effect: 13 ☐ AM ☐ PM

Train Dispatcher/Others: 14

Plate: 15 Notified: 16 ☐ AM ☐ PM Permission: 17 ☐ AM ☐ PM

Figure FAR 9-3. Work Permit Permissions Section of Electrical Work Permit Form NEC.85

Refer to "work permit permissions section" of NEC.85 form, which consists of spaces 9-17 in Figure FAR 9-3 above.

9. **Adds** name(s) of "Load Dispatcher" on duty involved in permit request / issue process.

- Megowen
- Nangle
- Yeager
- Basile

10. **Enters** "permit number" that was supplied by Load Dispatcher.

11. **Enters** time Load Dispatcher was "notified" of permit request. Adds check mark for AM or PM.

12. **Enters** time "permission received" from Load Dispatcher. Adds check mark for AM or PM.

13. **Records** time permit was put "in effect". Adds check mark for AM or PM.

14. **Provides** "names and / or title" required to provide permissions work permit such as:

- Train Dispatchers
- Tower Operators

15. **Records** power sectionalizing "plate" name and number as required by plate reference book.

16. **Enters** time individuals named in No.14 above were "notified". Adds check mark for AM or PM.

17. **Enters** time "permission received" for authorization request from individuals named in No.14 above. Adds check mark for AM or PM.



POWER DIRECTOR OPERATING GUIDELINES

FAR-9 Maintaining Electrical Work Permit Form NEC.85

Task Outline

25-FOI-00546

00000004203

"UNCLASSIFIED"

8/21/2025

Location	Device			Opened		Tagged		Tag Removed		Closed	
	Switch	Breaker	Air Break	Time:	Date:	Time:	Date:	Time:	Date:	Time:	Date:
18	19	20	21	22		23		24		25	

Figure FAR 9-4. Switching / Tagging of Devices Section of Electrical Work Permit Form NEC.85

Refer to “switching / tagging of devices section” of NEC.85 form, which consists of spaces 18-25 in Figure FAR 9-4 above.

18. **Adds** “location” of devices to be operated as identified in columns 23, 24 and 25 such as:

- Substations: Sub 15 Bacon Hill, Sub 64 Frazer
- Signal Bridges: EBHS Shore
- Interlockings: Phil, Zoo, Thorn, Charles
- Yards: Ivy City Yard, PCY

19. **Enters** specific name of “switch” to be operated such as:

- Signal equipment disconnects: 52B&T, 52L 1-2-3, 52BL, 52-1, 152T, T1-T2,
- Trolley breaker disconnect switches: 1604 B&F, 903 B&F
- Track heater station disconnects: HTRL3, HT4, HSM, HSE, HT4W
- Low side breaker disconnects: 1ALBs, 2ALBs, 3LBs
- Bus breaker disconnects: 9B, 30B disconnects
- Sect. switches: 33S, 22N, 11W

20. **Enters** specific name of circuit “breaker” to be operated such as:

- Trolley breakers: 6502, 3001, 1102
- Low side breakers: 1AL, 2L, 4L
- Signal breakers: 252, 52A, 152A, 252A, 252B, 252C, 252E, 352
- Bus / Bus Tie breakers: BB, BB12, BB1, B61T

21. **Enters** specific name of “air break” switch to be operated such as:

- Transmission tie switches: 21, 12, 22HT, 176
- High side switches: 1H, 2AH, P3H
- Transmission line / ground switches: 123, 123G, 130W, 130WG, 1FP, 1FPG

22. **Records** time / date device listed was “opened” or checked open.

23. **Records** time / date “tag applied” to device listed.

- Paper: Do Not Operate red tag (NEC-105)
- Electronic: SCADA

24. **Records** time / date “tag removed” from device listed.

25. **Records** time / date that device listed was “closed”.

- If device is left open, enters “open” in space.

ATTENTION

The Switching / Tagging of Devices Section of Form can also be used to track additional information

Location	Device			Opened		Tagged		Tag Removed		Closed	
	Switch	Breaker	Air Break	Time:	Date:	Time:	Date:	Time:	Date:	Time:	Date:
Sub 10 Glenolden	DC removed from 1AH at _____ Restored at _____										
"	RTU Disconnected at _____ Reconnected at _____										



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FAR-9 Maintaining Electrical Work Permit Form NEC.85

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Work Permit No: **26** Day: **27** Date: **28** To: **29**

Has permission to work on the following: _____

30

Time effective: **31** ☐ AM ☐ PM Work Permit repeated correctly at: **32** ☐ AM ☐ PM

Power Director: **33**

Work Permit Issued (Print/ Sign)

Figure FAR 9-5. Issuing a Work Permit Section of Electrical Work Permit Form NEC.85

Refer to "issuing a work permit section" of NEC.85 form, which consists of spaces 26-33 in Figure FAR 9-5 above.

26. **Enters** "work permit number".
27. **Enters** "day" work permit is being issued.
28. **Enters** "date" work permit is being issued.
29. **Enters** "name" of Class "A" employee receiving work permit.
30. **Writes** apparatus where "permission has been granted to work on" including any special instruction or operating restriction such as:
 - Permission to work on relay testing only for the 901 circuit breaker at Sub 9 Zoo
 - Permission to work on and operate the #2 Signal Motor Generator set at Sub 2A Arsenal
 - Permission to work on and operate the RTU cabinet only at Sub 19 North Point in the disconnected position.
 - Permission to work on and operate the 216, 216G motor mechanism only at Sub 16 Perryville in the uncoupled position.
 - Permission to work on secondary only for the HTR2 at Mantua.
 - Permission to work on the battery bank only at Sub 10 Glenolden.
31. **Enters** time work permit was made "effective". Adds check mark for AM or PM.
32. **Enters** time work permit body and effective time "repeated correctly" by Class "A" employee. Adds check mark for AM or PM.
33. **Prints** and **signs** name after "work permit issued" to Class "A" employee.



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FAR-9 Maintaining Electrical Work Permit Form NEC.85

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Work Permit No: **34** Day: **35** Date: **36** Employee: **37**

Reports work completed, all personnel clear from following: **38** (read body work permit) **39** ☐ OK ☐ NOT OK for service at: **40** ☐ AM ☐ PM

Power Director: **41**

Work Permit Completed (Print/ Sign)

Figure FAR 9-6. Releasing a Work Permit Section of Electrical Work Permit Form NEC.85

Refer to "releasing a work permit section" of NEC.85 form, which consists of spaces 34-41 in Figure FAR 9-6 above.

34. **Enters** "work permit number".
35. **Enters** "day" work permit is being released.
36. **Enters** "date" work permit is being released.
37. **Enters** "name" of Class "A" employee releasing work permit.
38. **Reads** apparatus as stated in No.30 above. "body of work permit" being released
39. **Places** check mark to state if apparatus is being released as "OK or NOT OK" for service.
40. **Enters** time apparatus is being released as "OK or NOT OK" to for service. Adds check mark for AM or PM.
41. **Prints** and **signs** name after "work permit completed".



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Load Dispatcher: 42

Permit No: 43 Notified: 44 ☐ AM ☐ PM Released: 45 ☐ AM ☐ PM Completed: 46 ☐ AM ☐ PM

Train Dispatcher/Others: 47

Plate: 48 Notified: 49 ☐ AM ☐ PM Released: 50 ☐ AM ☐ PM

NEC-85 (Rev. 07.22)

Amtrak is a registered service mark of the National Railroad Passenger Corporation.

Figure FAR 9-7. Work Permit Permissions Section of Electrical Work Permit Form NEC.85

Refer to "work permit permissions section" of NEC.85 form, which consists of spaces 42-50 in Figure FAR 9-7 above.

42. **Adds** name(s) of "Load Dispatcher" on duty involved in permit release process.

- Khatchadourian
- Kniple
- Harris
- Caruso

43. **Enters** "permit number"

44. **Enters** time Load Dispatcher was "notified" of permit release request. Adds check mark for AM or PM.

45. **Enters** time "permission received" from Load Dispatcher to release permit. Adds check mark for AM or PM.

46. **Records** time permit was "completed". Adds check mark for AM or PM.

47. **Provides** "names and / or title of people" notified of work permit release such as:

- Train Dispatchers
- Tower Operators

48. **Records** power sectionalizing "plate" name and number to be released.

49. **Enters** time people named in No.47 above were "notified". Adds check mark for AM or PM.

50. **Enters** time plate was "released". Adds check mark for AM or PM.

25 HZ SUBSTATION OPERATION OVERVIEW

Along the right of way (ROW) step-down substations, as shown in Figure 1-1, are strategically located 8-10 miles apart for secondary distribution of power to the (12 kV) overhead catenary system, for the propulsion of electric trains. The (138 kV) transmission lines enter the substations through an arrangement of (138 kV) air break and air break tie switches that provide the means to sectionalize, ground, or reconfigure sections of the transmission network.



Figure 1-1. Substation 09 Zoo

Droppers tap off the (138 kV) bus to the high side switches that are used to isolate the primary side of the (4500 kVa) step-down transformers. There the voltage is transformed by mutual induction to the secondary winding to obtain a nominal (output) voltage of 12 kV, roughly an 11.5 to 1 ratio. A low side breaker protects the secondary side of the transformer from fault current flowing back from the (12 kV) bus section, and protects the bus section from fault current flowing from the transmission line or transformer internal fault. A typical arrangement is a single transformer being fed from a single transmission line, to a respective (12 kV) bus section. There are normally two or more (12 kV) single bus sections connected through bus tie breakers (BB) that maintain continuity of the catenary circuits through the station. This continuity is sometimes referred to as being the third or fifth (NYD Division) transmission circuit.

Trolley breakers are connected to the (12 kV) bus sections through a set of bus and feeder (B&F) disconnects, which isolate the trolley breakers from the bus section and trolley taps. The trolley tap is made through the trolley (T) disconnect, however some locations may also have a line (L) switch in a circuit that is being fed at some distance from the substation.

Switching stations, as shown in Figure 1-2 on the next page, are an arrangement of feeders, breakers and switchgear designed to maintain continuity or isolate between substations and strategically located in high volume traffic areas where it may not be practical or necessary to have power transformers.

Switching stations are locations normally fed by two or more feeders, either lines or cables that deliver the primary source of power to the station bus sections. A typical location may have a group of Master breakers that feed a Low Rupture bus section and subsequent low rupture circuits (I.E. Sub 25A Union and Sub 43 Penn Station 31st and 7th Ave.).

Relay protection is set up so that a fault trips the Master breaker and the Low Rupture breaker associated with the faulted circuit.

The Master breaker will re-close automatically after the faulted Low Rupture breaker (LRB) is cleared; thus, restoring power to the remaining LRBs connected to that bus section.

Sub 03 Bryn Mawr, Sub 06 North Philadelphia and Sub 44 Sunnyside are also examples of switching stations but there is no Master – Low Rupture breaker set-up. These switching stations provide power to the (12 kV) bus sections via trolley circuits energized from adjacent step-down substations.



Figure 1-2. Switching Station 25A Union

This section will focus on tasks the Power Director performs associated with substation operation.

SUB-1 **Issuing & Releasing** a (12 kV) Trolley Circuit Breaker Clearance.

SUB-2 **Issuing & Releasing** a (12 kV) Trolley Circuit Breaker including Lightning Arrester Clearance.

SUB-1 ISSUING & RELEASING A (12 kV) TROLLEY CIRCUIT BREAKER CLEARANCE**1.0 INTRODUCTION**

A trolley circuit breaker, as shown in Figure Sub 1-1, is a device component of the traction power distribution system used to supply electrical power to the overhead catenary system for the propulsion of electric trains. It normally operates automatically under conditions of overload, short circuit, or by remote control to energize or de-energize a section of the overhead catenary system.

Whenever maintenance, repair, troubleshooting, protection, or construction work requiring the de-energization and isolation of a trolley circuit breaker in a substation is scheduled, the Class "A" employee will make the following request for clearance to the Power Director; *Example: 3002 (12 kV) Trolley Circuit Breaker at Sub 30 Frankford.*

After the clearance request, the Power Director is then responsible for determining any permissions and the equipment that must be operated to clear the trolley circuit breaker. It is the Power Director's responsibility to ensure power is available from another source or tie point to ensure the trolley circuit remains energized.

A plate order must be obtained by the Power Director prior to de-energizing single-end circuits that cannot be tied. Permission must be obtained from individuals who has jurisdiction over the affected trolley circuit prior to de-energizing the trolley circuit breaker. The Load Dispatcher must be notified prior to de-energizing all the trolley circuits in a specified section of track. All notifications will be conducted over a recorded line.

The bus and feeder (B&F) disconnects are the manually operated energy isolation devices for a trolley circuit breaker clearance. When work is complete, the Class "A" employee will contact the Power Director and state that the work is complete, all personnel clear, grounds removed, and the clearance can be released. After the clearance is released, the Power Director will direct or perform all switching to restore



Figure Sub 1-1. (12 kV) Trolley Circuit Breaker



the trolley circuit breaker to service. Figure Sub 1-2 shows a properly filled out (12 kV) trolley circuit breaker Clearance Form (NEC.84).

2.0 TASK OBJECTIVE

Establish a zone of protection for a trolley circuit breaker; issue a clearance to the Class "A" employee in the field; then restore to service after clearance is released.

3.0 RECOMMENDED CONDITIONS

This task should be performed when a Class "A" employee requests a clearance on a (12 kV) trolley circuit breaker.

4.0 REFERENCES

- Power Director Clearance Form (NEC.84)
- SOI.203 Voltage Testing & Verification Procedure
- SOI.211 Electrical Clearance Procedure
- FAR-4 Maintaining Clearance Form (NEC.84)
- SCADA Operating System
- Substation One-Line Diagram
- Trolley Sectionalizing Diagram
- Power Sectionalizing Plate Diagram
- AMT.2 Electrical Operating Rules & Instructions
- Appendix A. Glossary
- Appendix B. Abbreviations & Acronyms

5.0 POWER DIRECTOR ACTION

For a clearance request initiated by the Class "A" employee on a (12 kV) trolley circuit breaker, the **Power Director**:

1. **Repeats** clearance requested.
2. **Provides** correction of any errors.
3. **Ensures** Class "A" employee provides following information:
 - Name
 - Title
 - Location and nature of work
 - Designation of circuit(s) / apparatus to be de-energized
 - Limits of clearance
 - Personnel protecting
 - Duration of outage
 - Emergency clear up time
 - Anticipated personal protective ground locations



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4. **Determines** if request is approved.
5. **Adds** required information on form.
 - Any additional information pertaining to clearance can be entered under "Remarks"



Electric Traction Power Director Clearance Form

Clearance No: 100 Day: Thursday Date: March 07, 2019 Time Requested: 9:00 ☒ AM ☐ PM

Power must be removed from: 3002 (12 kV) Trolley Circuit Breaker On account of: Maximo Compliance Location: Sub 30 Frankford

Remarks: Contact No. xxx-xxx-xxxx

6. If other end of trolley circuit extends outside of your operating zone:
 - 6a. **Notifies** individual having jurisdiction over affected circuit.
7. If trolley circuit is a single-end feed and no tie switch available:
 - 7a. **Requests** correct plate order from individuals having jurisdiction over affected circuit.
8. **Records** N/A for areas that don't pertain to clearance.

Train Dispatchers/ Others

<u>NYPD Zone 2/3</u>	Plate: <u>N/A</u>	Notified: <u>9:05</u> ☒ AM ☐ PM	Permission: ☐ AM ☐ PM
	Plate: _____	Notified: ☐ AM ☐ PM	Permission: ☐ AM ☐ PM
	Plate: _____	Notified: ☐ AM ☐ PM	Permission: ☐ AM ☐ PM
	Plate: _____	Notified: ☐ AM ☐ PM	Permission: ☐ AM ☐ PM
<u>N/A</u>	Notified: ☐ AM ☐ PM	Permission: ☐ AM ☐ PM	Completed: ☐ AM ☐ PM
Signal Interruption			
Load Dispatcher: <u>N/A</u>	Permit No. _____	Notified: ☐ AM ☐ PM	Permission: ☐ AM ☐ PM In Effect: ☐ AM ☐ PM

9. **Writes** all required switching.
 - Includes location of devices to be operated.

Location	Device			Opened		Tagged		Tag Removed		Closed	
	Switch	Breaker	Air Break	Time:	Date:	Time:	Date:	Time:	Date:	Time:	Date:
<u>S30 Frankford</u>		<u>3002</u>									
<u>"</u>		<u>3002 B&F</u>									



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10. **Writes** circuit / apparatus where power will be removed. DO NOT use abbreviations.

- referred to as body of clearance being issued

Clearance No: _____ Day: _____ Date: _____ To: _____

Power has been removed from the following circuit/apparatus:

3002 (12 kV) Trolley Circuit Breaker at Sub 30 Frankford

11. **Confirms** following if required prior to opening trolley circuit breaker:

- Plate orders have been approved
- Connecting breaker and switches or tie switch is closed to back feed trolley circuit
- Permission received from individuals having jurisdiction over affected trolley circuit

Train Dispatcher/ Others

NYPD Zone 2/3	Plate: N/A	Notified: 9:05 ☒ AM ☐ PM	Permission: 9:05 ☒ AM ☐ PM
	Plate: _____	Notified: _____ ☐ AM ☐ PM	Permission: _____ ☐ AM ☐ PM
	Plate: _____	Notified: _____ ☐ AM ☐ PM	Permission: _____ ☐ AM ☐ PM
	Plate: _____	Notified: _____ ☐ AM ☐ PM	Permission: _____ ☐ AM ☐ PM
N/A	Notified: _____ ☐ AM ☐ PM	Permission: _____ ☐ AM ☐ PM	Completed: _____ ☐ AM ☐ PM

Signal Interruption

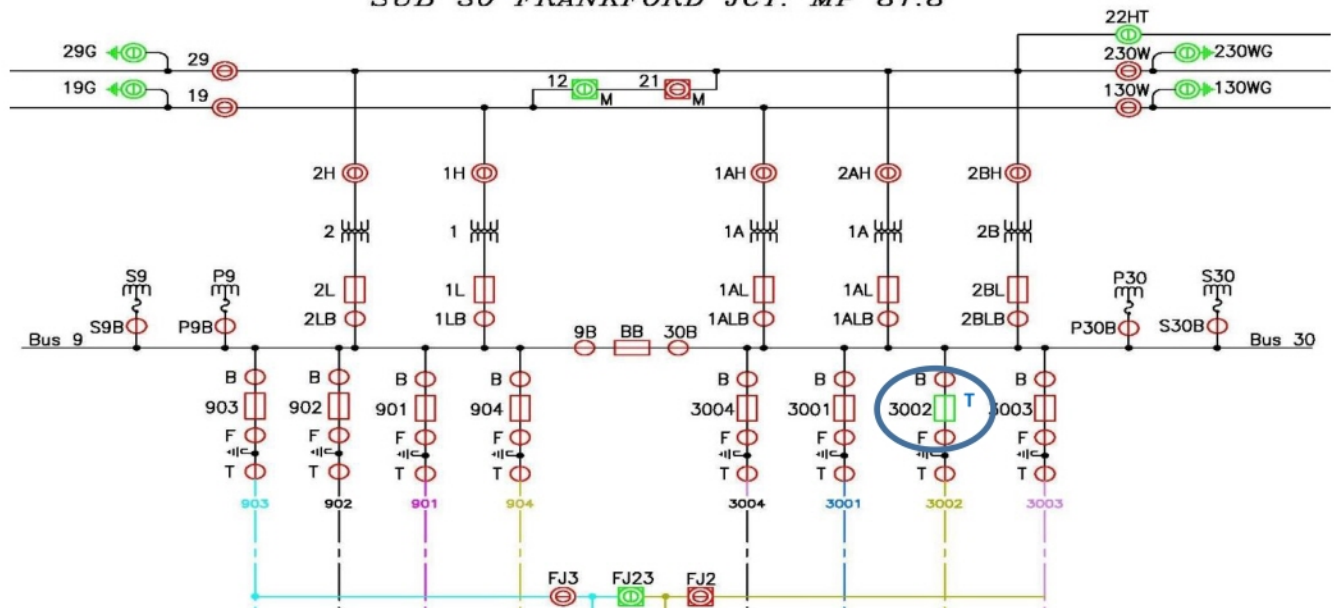
Load Dispatcher: **N/A** Permit No. _____ Notified: _____ ☐ AM ☐ PM Permission: _____ ☐ AM ☐ PM In Effect: _____ ☐ AM ☐ PM

12. **Confirms** with substation personnel in clear prior to opening trolley circuit breaker.

13. **Opens** and **applies** tag to trolley circuit breaker.

- SCADA tag applied to trolley circuit breaker must be non EEPS tag.

SUB 30 FRANKFORD JCT. MP 81.8





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14. **Places** mark (x) to confirm operation.

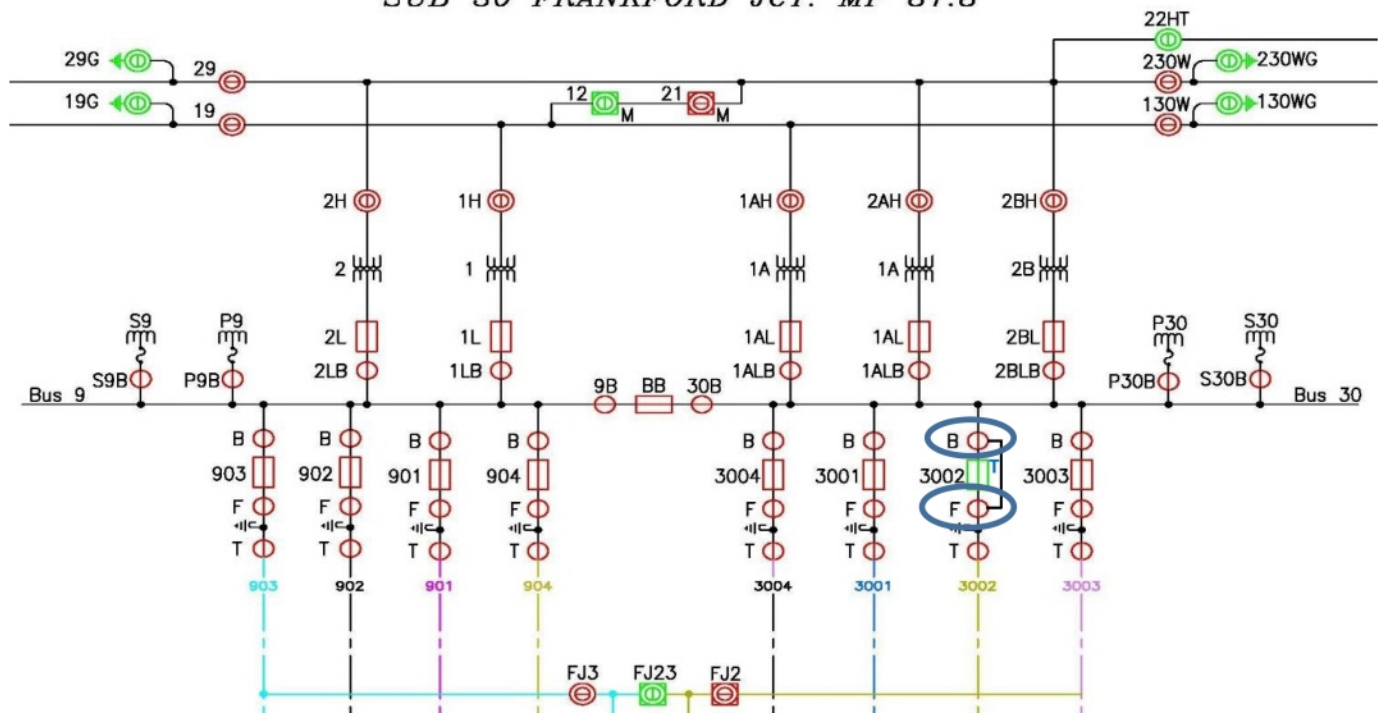
15. **Records** time and date breaker opened, with tag applied.

Location	Device			Opened		Tagged		Tag Removed		Closed	
	Switch	Breaker	Air Break	Time:	Date:	Time:	Date:	Time:	Date:	Time:	Date:
S30 Frankford		3002 X		9:10am	03.07.19	9:10am	03.07.19				
"	3002 B&F										

16. **Issues** following switching orders to Class "A" employee:

- Check open 3002 trolley circuit breaker at Sub 30 Frankford
- Open 3002 B&F disconnects. Check open. Apply lock and tag with clearance no. xxx

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17. **Places** mark (/) to confirm switching orders given to Class "A" employee.

Location	Device			Opened		Tagged		Tag Removed		Closed	
	Switch	Breaker	Air Break	Time:	Date:	Time:	Date:	Time:	Date:	Time:	Date:
S30 Frankford		3002 X		9:10am	03.07.19	9:10am	03.07.19				
"	3002 B&F	/									



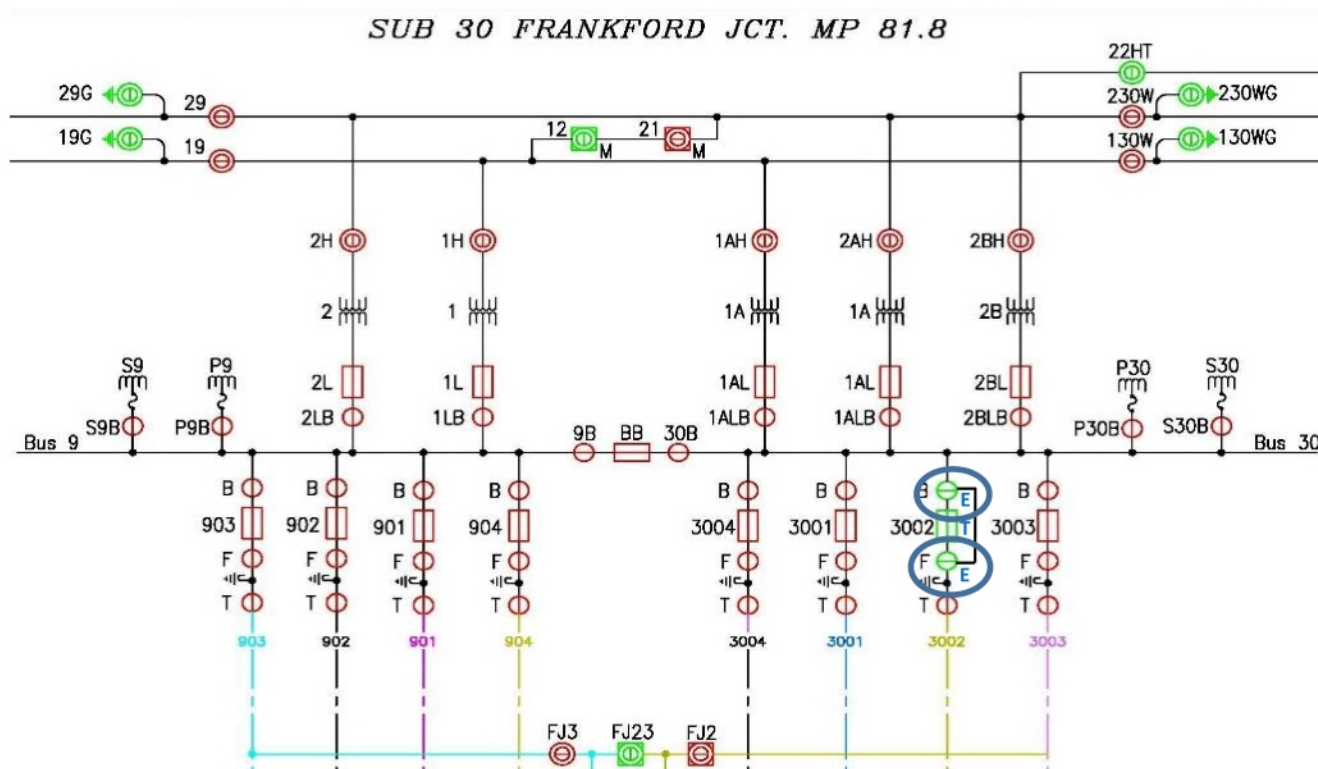
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18. **Opens** and **applies** EEPS tags to B & F disconnects.



19. **Places** 2ND mark (\) to confirm switching orders completed by Class "A" employee.

20. **Repeats** switching orders as performed by Class "A" employee.

21. **Records** time and date switching performed.

Location	Device			Opened		Tagged		Tag Removed		Closed	
	Switch	Breaker	Air Break	Time:	Date:	Time:	Date:	Time:	Date:	Time:	Date:
S30 Frankford		3002 X		9:10am	03.07.19	9:10am	03.07.19				
"		3002 B&F X		9:30am	03.07.19	9:30am	03.07.19				

22. **Verifies** blocking points for clearance in EEPS BDR (blocking device release) code text message are correct with Class "A" employee.

23. If "BDR code" text message not received by Class "A" employee:

23a. **Establishes** positive contact with System Manager and **provides** relevant information including:

- Class "A" employee name
- Class "A" employee contact information
- Clearance number
- Clearance circuit / apparatus
- Devices tagged



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23b. **Awaits** further instructions from System Manager.

ATTENTION

Power Director will not be issued the "BDR Code" until clearance has been released.

24. **Grants** permission to Class "A" employee to test circuit / apparatus de-energized.

25. **Records** time permission given.

138 kV ground switch checked closed by: N/A Location: _____ at: _____ ☐ AM ☐ PM

Mike Rutherford

Employee

Permission to test (circuit/apparatus) de-energized at: 9:33am ☒ AM ☐ PM

tested (circuit/apparatus) de-energized at: _____ ☐ AM ☐ PM

26. **Records** time circuit / apparatus tested de-energized by Class "A" employee.

138 kV ground switch checked closed by: N/A Location: _____ at: _____ ☐ AM ☐ PM

Mike Rutherford

Employee

Permission to test (circuit/apparatus) de-energized at: 9:33am ☒ AM ☐ PM

tested (circuit/apparatus) de-energized at: 9:48am ☒ AM ☐ PM

27. **Issues** clearance to Class "A" employee with permission to ground and time effective.

- Includes clearance No., day, date, and time clearance issued

Clearance No: 100 Day: Thursday Date: March 07, 2019 To: Mike Rutherford

Power has been removed from the following circuit/apparatus:

3002 (12 kV) Trolley Circuit Breaker at Sub 30 Frankford

Permission to ground above circuit/apparatus: Time effective: 9:50 ☒ AM ☐ PM Clearance repeated correctly at: _____ ☐ AM ☐ PM

No. of Grounds applied: _____

Power Director: _____

Clearance Issued (Print/ Sign)

Location of Grounds: _____



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28. **States** clearance repeated correctly by Class "A" employee receiving clearance with time.

Clearance No: 100 Day: Thursday Date: March 07, 2019 To: Mike Rutherford

Power has been removed from the following circuit/apparatus:

3002 (12 kV) Trolley Circuit Breaker at Sub 30 Frankford

Permission to ground above circuit/apparatus: Time effective: 9:50 ☒ AM ☐ PM Clearance repeated correctly at: 9:50 ☒ AM ☐ PM

No. of Grounds applied: 2 Power Director: Phil Collins / Phil Collins
Clearance Issued (Print/ Sign)

Location of Grounds: 3002 Breaker side B&F disconnects

29. **Prints** and **signs** name after clearance issued.

Clearance No: 100 Day: Thursday Date: March 07, 2019 To: Mike Rutherford

Power has been removed from the following circuit/apparatus:

3002 (12 kV) Trolley Circuit Breaker at Sub 30 Frankford

Permission to ground above circuit/apparatus: Time effective: 9:50 ☒ AM ☐ PM Clearance repeated correctly at: 9:50 ☒ AM ☐ PM

No. of Grounds applied: _____ Power Director: Phil Collins / Phil Collins
Clearance Issued (Print/ Sign)

Location of Grounds: _____

30. **Repeats** and **records** number and location of all grounds applied, or to be applied if known, as reported by Class "A" employee.

Clearance No: 100 Day: Thursday Date: March 07, 2019 To: Mike Rutherford

Power has been removed from the following circuit/apparatus:

3002 (12 kV) Trolley Circuit Breaker at Sub 30 Frankford

Permission to ground above circuit/apparatus: Time effective: 9:50 ☒ AM ☐ PM Clearance repeated correctly at: 9:50 ☒ AM ☐ PM

No. of Grounds applied: 2 Power Director: Phil Collins / Phil Collins
Clearance Issued (Print/ Sign)

Location of Grounds: 3002 Breaker side B&F disconnects



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For a clearance release by the Class "A" employee on a (12 kV) trolley circuit breaker, the **Power Director**:

31. **Repeats** and **records** number and location of all grounds removed as reported by Class "A" employee.

Location of Grounds: 3002 Breaker side B&F disconnects

No. of Grounds removed: 2

Clearance No: _____ Day: _____ Date: _____ Employee: _____

Reports work completed, all personnel clear, grounds ☐ Removed ☐ NOT Removed from following circuit/apparatus: (read body of clearance)

☐ OK ☐ NOT OK to energize at: _____ ☐ AM ☐ PM ☐ Energized ☐ NOT Energized at: _____ ☐ AM ☐ PM

32. **Instructs** Class "A" employee to proceed with clearance release.

- Includes clearance No., day, date, and time clearance released

33. **Gives** time clearance is OK to energize per Class "A" employee.

34. **Repeats** clearance release information to Class "A" employee.

Location of Grounds: 3002 Breaker side B&F disconnects

No. of Grounds removed: 2

Clearance No: 100 Day: Thursday Date: March 07, 2019 Employee: Mike Rutherford

Reports work completed, all personnel clear, grounds ☒ Removed ☐ NOT Removed from following circuit/apparatus: (read body of clearance)

☒ OK ☐ NOT OK to energize at: 2:00 ☐ AM ☒ PM ☐ Energized ☐ NOT Energized at: _____ ☐ AM ☐ PM

35. **Requests** "BDR code" from Class "A" employee who released clearance.

36. If "BDR code" text message not received by Class "A" employee:

- 36a. **Establishes** positive contact with System Manager and **provides** relevant information including:

- Class "A" employee name
- Class "A" employee contact information
- Clearance number
- Clearance circuit / apparatus
- Devices tagged

- 36b. **Awaits** further instructions from System Manager.



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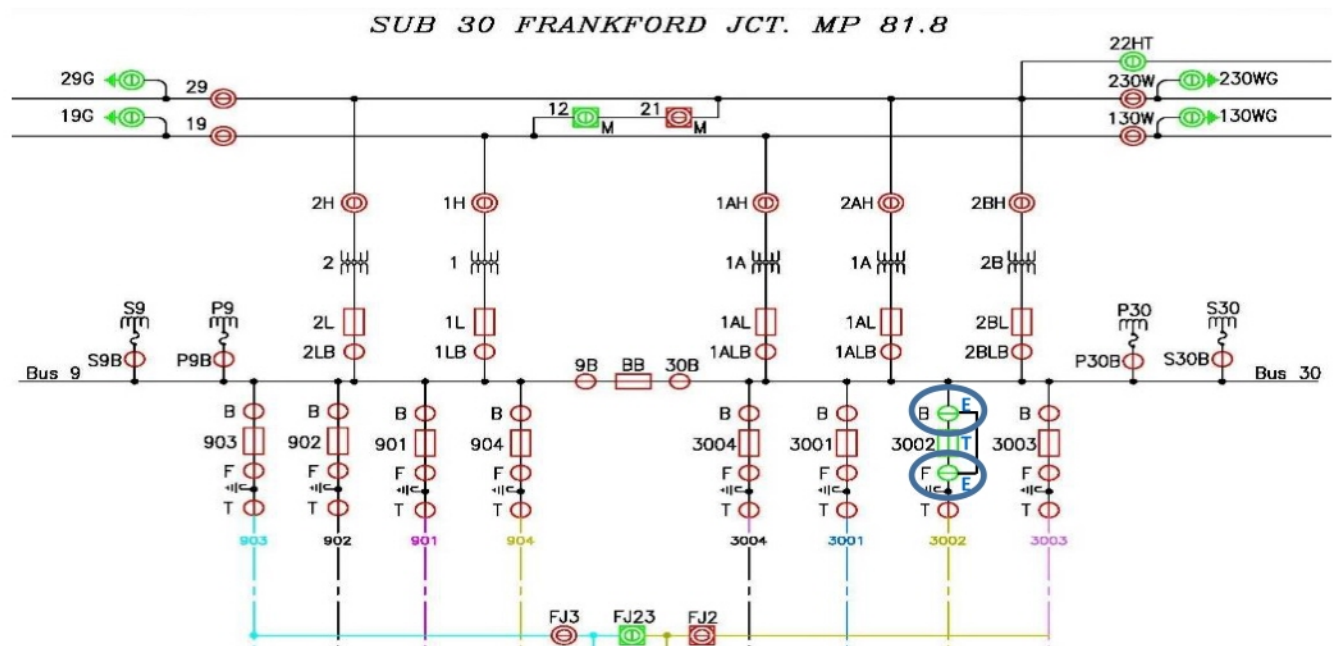
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37. **Issues** following switching orders to Class "A" employee:

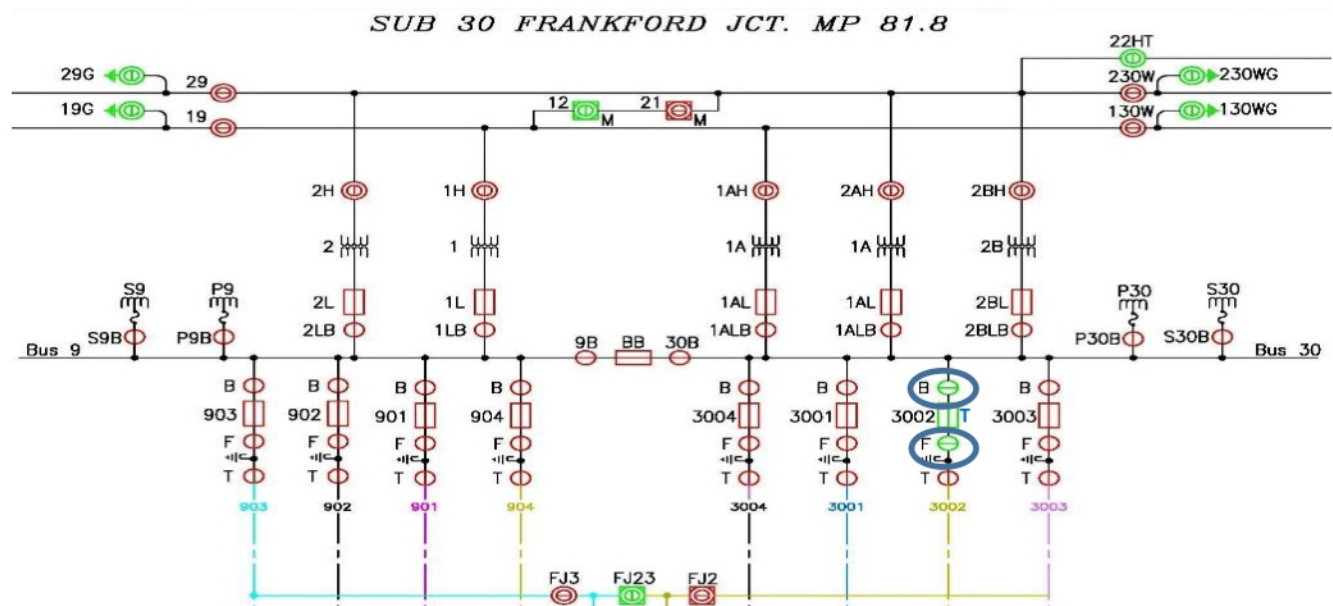
- Check Open 3002 trolley circuit breaker at Sub 30 Frankford
- Remove lock and tag. Close 3002 B&F disconnects. Check close and lock close



38. **Places 3RD** mark (/) to confirm switching orders given to Class "A" employee.

Location	Device			Opened		Tagged		Tag Removed		Closed	
	Switch	Breaker	Air Break	Time:	Date:	Time:	Date:	Time:	Date:	Time:	Date:
S30 Frankford		3002		9:10am	03.07.19	9:10am	03.07.19				
"		3002 B&F		9:30am	03.07.19	9:30am	03.07.19				

39. **Removes** EEPS tags from B & F disconnects.





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40. **Places** 4TH mark (\) to confirm switching orders completed by Class "A" employee.
41. **Repeats** switching orders as performed by Class "A" employee.
42. **Records** time and date switching performed.

Location	Device			Opened		Tagged		Tag Removed		Closed	
	Switch	Breaker	Air Break	Time:	Date:	Time:	Date:	Time:	Date:	Time:	Date:
S30 Frankford		3002 X		9:10am	03.07.19	9:10am	03.07.19				
"	3002 B&F	X X		9:30am	03.07.19	9:30am	03.07.19	2:15pm	03.07.19	2:15pm	03.07.19

43. **Records** time clearance was energized.

Location of Grounds: **3002 Breaker side B&F disconnects**

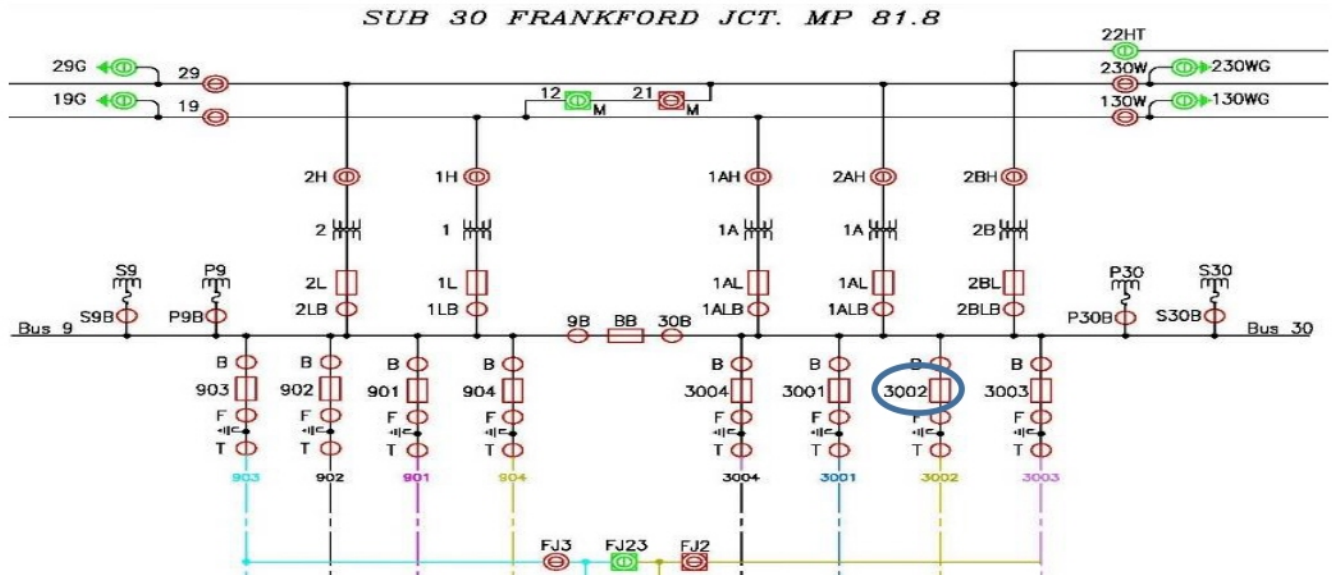
No. of Grounds removed: **2**

Clearance No: **100** Day: **Thursday** Date: **March 07, 2019** Employee: **Mike Rutherford**

Reports work completed, all personnel clear, grounds ☒ Removed ☐ NOT Removed from following circuit/apparatus: (read body of clearance)

☒ OK ☐ NOT OK to energize at: **2:00** ☐ AM ☒ PM ☒ Energized ☐ NOT Energized at: **2:15** ☐ AM ☒ PM

44. **Confirms** with substation personnel in clear prior to closing trolley circuit breaker.
45. **Removes** tag and **closes** trolley circuit breaker.



46. **Places** 2nd mark (x) to confirm operation.
47. **Records** time and date tag removed, and breaker closed.

Location	Device			Opened		Tagged		Tag Removed		Closed	
	Switch	Breaker	Air Break	Time:	Date:	Time:	Date:	Time:	Date:	Time:	Date:
S30 Frankford		3002 X X		9:10am	03.07.19	9:10am	03.07.19	2:26pm	03.07.19	2:26pm	03.07.19
"	3002 B&F	X X		9:30am	03.07.19	9:30am	03.07.19	2:15pm	03.07.19	2:15pm	03.07.19



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SUB-1 Issuing & Releasing a (12 kV) Trolley Circuit Breaker Clearance

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48. If tie switch was closed to back feed circuit:

48a. **Opens** tie switch.

49. If other end of trolley circuit extends outside of your operating zone:

49a. **Notifies** individual who has jurisdiction over affected circuit that power restored.

50. If trolley circuit is a single-end feed and no tie switch available:

50a. **Releases** plate order to individuals who has jurisdiction over affected circuit.

51. **Records** N/A for areas that don't pertain to clearance.

Train Dispatcher/ Others	
NYPD Zone 2/3	Plate: N/A Notified: 2:35 ☐ AM ☒ PM Released: ☐ AM ☐ PM
	Plate: Notified: ☐ AM ☐ PM Released: ☐ AM ☐ PM
	Plate: Notified: ☐ AM ☐ PM Released: ☐ AM ☐ PM
	Plate: Notified: ☐ AM ☐ PM Released: ☐ AM ☐ PM
N/A	Notified: ☐ AM ☐ PM Permission: ☐ AM ☐ PM Completed: ☐ AM ☐ PM
Signal Interruption	
Load Dispatcher: N/A	Permit No. Notified: ☐ AM ☐ PM Released: ☐ AM ☐ PM Completed: ☐ AM ☐ PM
Power Director: _____	
Clearance Completed (Print/ Sign)	

52. **Prints** and **signs** name after clearance completed.

Train Dispatcher/ Others	
NYPD Zone 2/3	Plate: N/A Notified: 2:35 ☐ AM ☒ PM Released: ☐ AM ☐ PM
	Plate: Notified: ☐ AM ☐ PM Released: ☐ AM ☐ PM
	Plate: Notified: ☐ AM ☐ PM Released: ☐ AM ☐ PM
	Plate: Notified: ☐ AM ☐ PM Released: ☐ AM ☐ PM
N/A	Notified: ☐ AM ☐ PM Permission: ☐ Completed: ☐ AM ☐ PM
Signal Interruption	
Load Dispatcher: N/A	Permit No. Notified: ☐ AM ☐ PM Released: ☐ AM ☐ PM Completed: ☐ AM ☐ PM
Power Director: Phil Collins / Phil Collins	
Clearance Completed (Print/ Sign)	

SUB-2 ISSUING & RELEASING A (12 kV) TROLLEY CIRCUIT BREAKER INCLUDING LIGHTNING ARRESTER CLEARANCE

1.0 INTRODUCTION

A lightning arrester, as shown in Figure Sub 2-1, is a device component used on electric power systems to protect electrical apparatus from damaging effects of lightning.

A typical lightning arrester has a high-voltage terminal and a ground terminal. When a lightning surge travels along the power line to the arrester, the current from the surge is diverted through the arrester. The arrester provides a low-impedance path to ground for the current from a lightning strike or transient voltage and then restores to a normal operating condition.

Whenever repairs, troubleshooting, double testing or replacement requiring the de-energization and

isolation of a trolley circuit breaker lightning arrester is scheduled, the Class "A" employee must add the associated trolley circuit breaker as part of the clearance request to the Power Director; *Example: 6401 (12 kV) Trolley Circuit Breaker including the Lightning Arrester at Sub 04 Paoli.*

After the clearance request, the Power Director is then responsible for determining any permissions and the equipment that must be operated to clear the trolley circuit breaker. It is the Power Director's responsibility to ensure power is available from another source or tie point to ensure the trolley circuit remains energized.

A plate order must be obtained by the Power Director prior to de-energizing single-end circuits that cannot be tied. Permission must be obtained from individuals who has jurisdiction over the affected trolley circuit prior to de-energizing the trolley circuit breaker. The Load Dispatcher must be notified prior to de-energizing all the trolley circuits in a specified section of track. All notifications will be conducted over a recorded line.

The bus and feeder (B&F) and trolley (T) disconnects are the manually operated energy isolation devices for a trolley circuit breaker and its lightning arrester clearance. When work is complete, the Class "A" employee will contact the Power Director and state that the work is complete, all personnel clear,



Figure Sub 2-1. (12 kV) Trolley Circuit Breaker Lightning Arresters



grounds removed, and the clearance can be released. After the clearance is released, the Power Director will direct or perform all switching to restore the trolley circuit breaker to service. Figure Sub 2-2 shows a properly filled out (12 kV) trolley circuit breaker including the lightning arrester Clearance Form (NEC.84).

2.0 TASK OBJECTIVE

Establish a zone of protection for a trolley circuit breaker including the lightning arrester; issue a clearance to the Class "A" employee in the field; then restore to service after clearance is released.

3.0 RECOMMENDED CONDITIONS

This task should be performed when a Class "A" employee requests a clearance on a (12 kV) trolley circuit breaker including the lightning arrester.

4.0 REFERENCES

- Power Director Clearance Form (NEC.84)
- SOI.203 Voltage Testing & Verification Procedure
- SOI.211 Electrical Clearance Procedure
- FAR-4 Maintaining Clearance Form (NEC.84)
- SCADA Operating System
- Substation One-Line Diagram
- Trolley Sectionalizing Diagram
- Power Sectionalizing Plate Diagram
- AMT.2 Electrical Operating Rules & Instructions
- Appendix A. Glossary
- Appendix B. Abbreviations & Acronyms

5.0 POWER DIRECTOR ACTION

For a clearance request initiated by the Class "A" employee on a (12 kV) trolley circuit breaker including the lightning arrester, the **Power Director**:

1. **Repeats** clearance requested.
2. **Provides** correction of any errors.
3. **Ensures** Class "A" employee provides following information:
 - Name
 - Title
 - Location and nature of work
 - Designation of circuit(s) / apparatus to be de-energized
 - Limits of clearance
 - Personnel protecting
 - Duration of outage
 - Emergency clear up time
 - Anticipated personal protective ground locations



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SUB-2 Issuing & Releasing a (12 kV) Trolley Circuit Breaker Including Lightning Arrester Clearance

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4. **Determines** if request is approved.
5. **Adds** required information on form.
 - Any additional information pertaining to clearance can be entered under "Remarks"



Electric Traction Power Director Clearance Form

Clearance No: 101 Day: Monday Date: March 02, 2020 Time Requested: 8:30 ☒ AM ☐ PM

Power must be removed from: 6401 (12 kV) Trolley CB including LA On account of: Doble Location: Sub 04 Paoli

Remarks: Contact No. xxx-xxx-xxxx

6. If other end of trolley circuit extends outside of your operating zone:
 - 6a. **Notifies** individual having jurisdiction over affected circuit.
7. If trolley circuit is a single-end feed and no tie switch available:
 - 7a. **Requests** correct plate order from individuals having jurisdiction over affected circuit.
8. **Records** N/A for areas that don't pertain to clearance.

Train Dispatcher/ Others

<u>Zone 8 PD</u>	Plate: <u>N/A</u>	Notified: <u>8:50</u> ☒ AM ☐ PM	Permission: ☐ AM ☐ PM
	Plate: _____	Notified: ☐ AM ☐ PM	Permission: ☐ AM ☐ PM
	Plate: _____	Notified: ☐ AM ☐ PM	Permission: ☐ AM ☐ PM
	Plate: _____	Notified: ☐ AM ☐ PM	Permission: ☐ AM ☐ PM
<u>N/A</u>	Notified: ☐ AM ☐ PM	Permission: ☐ AM ☐ PM	Completed: ☐ AM ☐ PM

Signal Interception

Load Dispatcher: N/A Permit No. _____ Notified: ☐ AM ☐ PM Permission: ☐ AM ☐ PM In Effect: ☐ AM ☐ PM

9. **Writes** all required switching.
 - Includes location of devices to be operated.

Location	Device			Opened		Tagged		Tag Removed		Closed	
	Switch	Breaker	Air Break	Time:	Date:	Time:	Date:	Time:	Date:	Time:	Date:
<u>S04 Paoli</u>		<u>6401</u>									
<u>"</u>	<u>6401 B&F</u>										
<u>"</u>	<u>6401 T</u>										



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10. **Writes** circuit / apparatus where power will be removed. DO NOT use abbreviations.

- referred to as body of clearance being issued

Clearance No: _____ Day: _____ Date: _____ To: _____

Power has been removed from the following circuit/apparatus:

6401 (12 kV) Trolley Circuit Breaker including the Lightning Arrester at Sub 04 Paoli

11. **Confirms** following if required prior to opening trolley circuit breaker:

- Plate orders have been approved
- Connecting breaker and switches or tie switch is closed to back feed trolley circuit
- Permission received from individuals having jurisdiction over affected trolley circuit

Train Dispatcher/ Others

Zone 8 PD	Plate: N/A	Notified: 8:50 ☒ AM ☐ PM	Permission: 9:00 ☒ AM ☐ PM
_____	Plate: _____	Notified: _____ ☐ AM ☐ PM	Permission: _____ ☐ AM ☐ PM
_____	Plate: _____	Notified: _____ ☐ AM ☐ PM	Permission: _____ ☐ AM ☐ PM
_____	Plate: _____	Notified: _____ ☐ AM ☐ PM	Permission: _____ ☐ AM ☐ PM
N/A	Notified: _____ ☐ AM ☐ PM	Permission: _____ ☐ AM ☐ PM	Completed: _____ ☐ AM ☐ PM

Signal Interruption

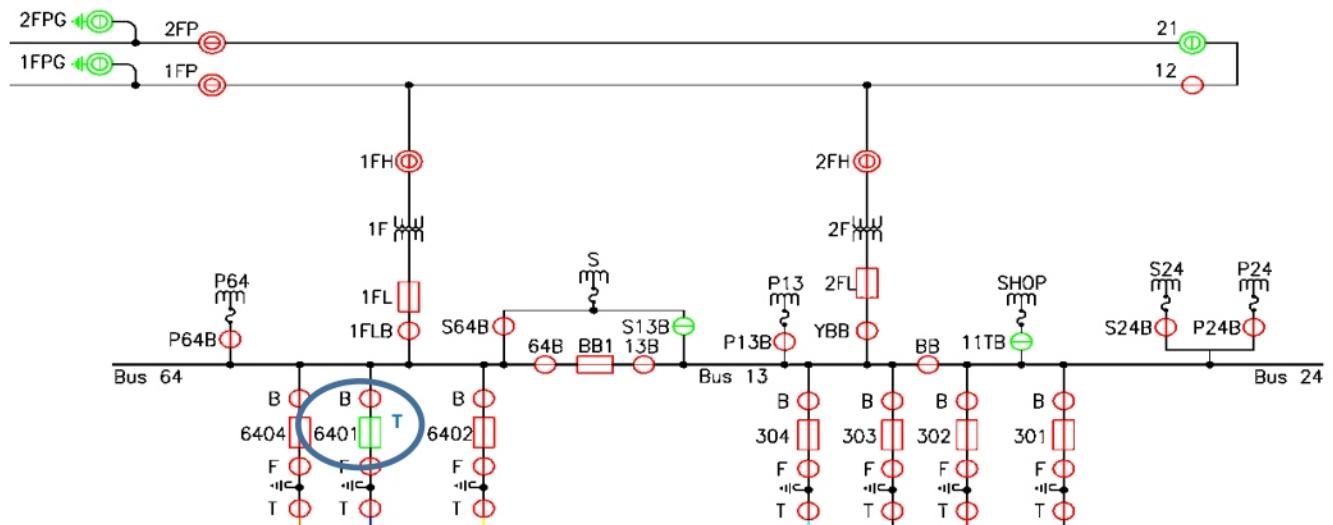
Load Dispatcher: **N/A** Permit No. _____ Notified: _____ ☐ AM ☐ PM Permission: _____ ☐ AM ☐ PM In Effect: _____ ☐ AM ☐ PM

12. **Confirms** with substation personnel in clear prior to opening trolley circuit breaker.

13. **Opens** and **applies** tag to trolley circuit breaker.

- SCADA tag applied to trolley circuit breaker must be non EEPs tag.

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14. **Places** mark (x) to confirm operation.

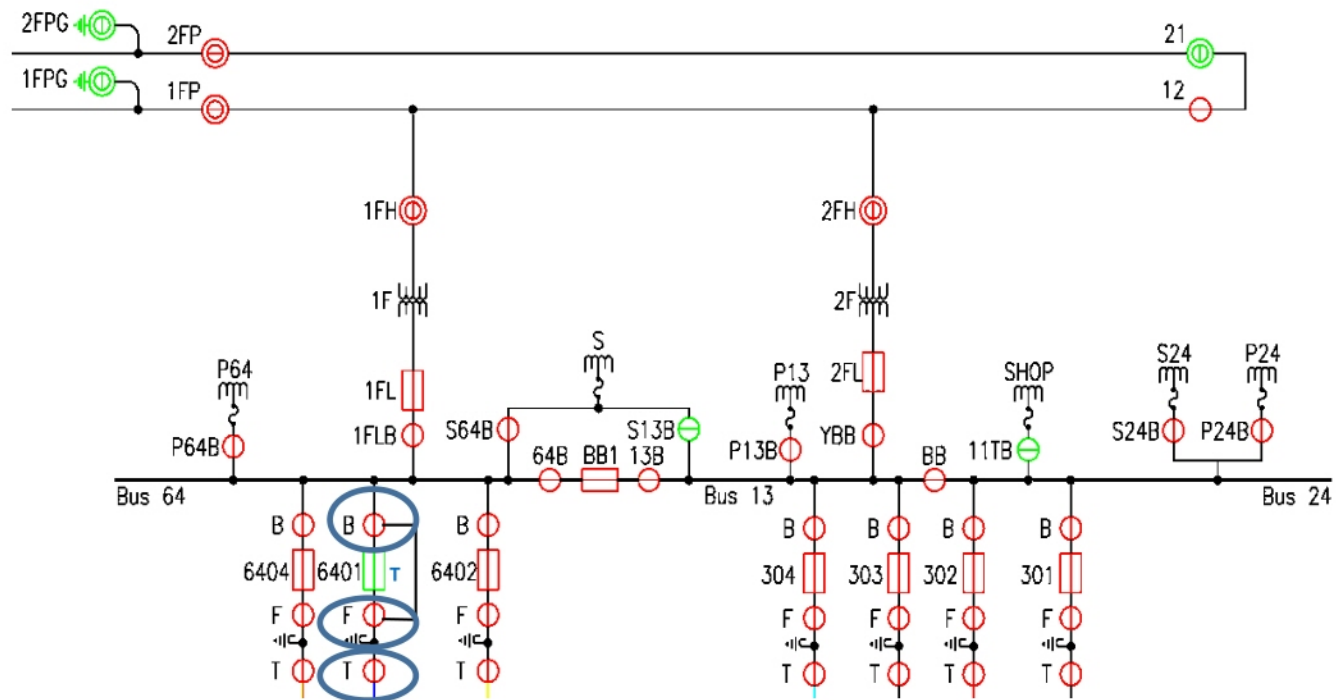
15. **Records** time and date breaker opened, with tag applied.

Location	Device			Opened		Tagged		Tag Removed		Closed	
	Switch	Breaker	Air Break	Time:	Date:	Time:	Date:	Time:	Date:	Time:	Date:
S04 Paoli		6401 X		9:07am	03.02.20	9:07am	03.02.20				
"	6401 B&F										
"	6401 T										

16. **Issues** following switching orders to Class "A" employee:

- Check open 6401 trolley circuit breaker at Sub 04 Paoli
- Open 6401 "B&F" and "T" disconnects. Check open. Apply lock and tag with clearance no. xxx

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17. **Places** mark (/) to confirm switching orders given to Class "A" employee.

Location	Device			Opened		Tagged		Tag Removed		Closed	
	Switch	Breaker	Air Break	Time:	Date:	Time:	Date:	Time:	Date:	Time:	Date:
S04 Paoli		6401 X		9:07am	03.02.20	9:07am	03.02.20				
"	6401 B&F	/									
"	6401 T	/									



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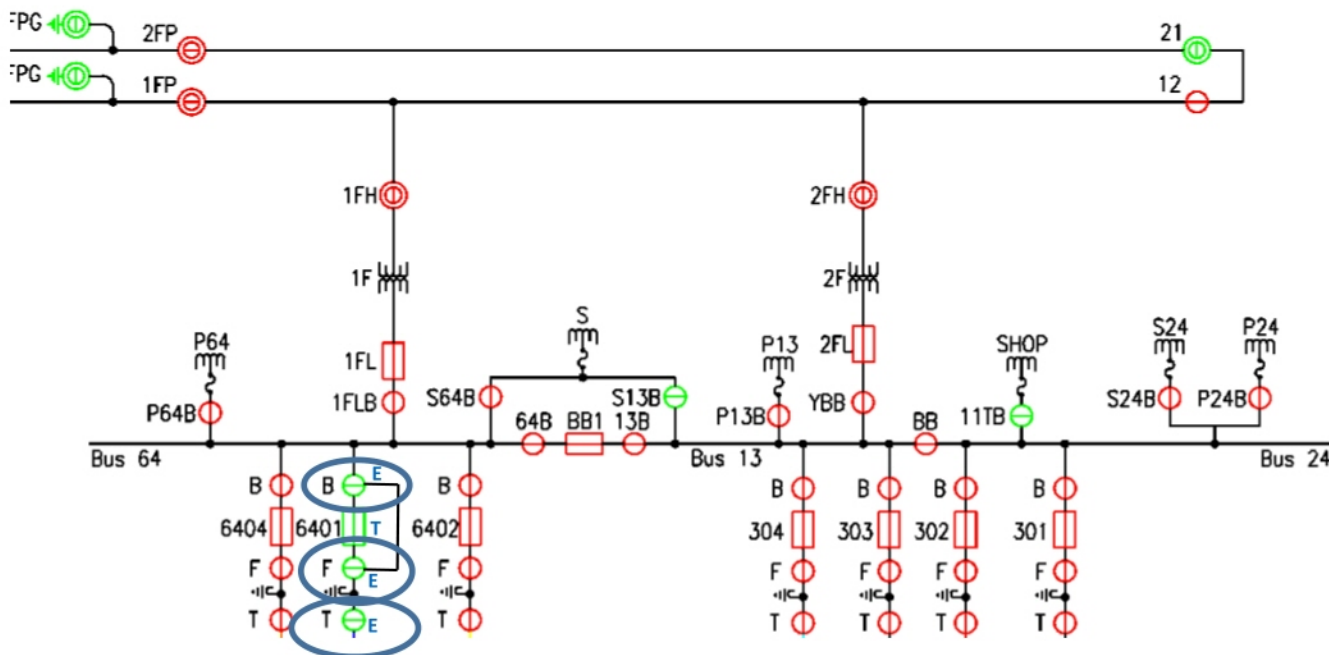
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18. **Opens** and **applies** EEPS tags to "B & F" and "T" disconnects.

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19. **Places** 2ND mark (\) to confirm switching orders completed by Class "A" employee.

20. **Repeats** switching orders as performed by Class "A" employee.

21. **Records** time and date switching performed.

Location	Device			Opened		Tagged		Tag Removed		Closed	
	Switch	Breaker	Air Break	Time:	Date:	Time:	Date:	Time:	Date:	Time:	Date:
S04 Paoli		6401 X		9:07am	03.02.20	9:07am	03.02.20				
"	6401 B&F	X		9:20am	03.02.20	9:20am	03.02.20				
"	6401 T	X		9:20am	03.02.20	9:20am	03.02.20				

22. **Verifies** blocking points for clearance in EEPS BDR (blocking device release) code text message are correct with Class "A" employee.

23. If "BDR code" text message not received by Class "A" employee:

23a. **Establishes** positive contact with System Manager and **provides** relevant information including:

- Class "A" employee name
- Class "A" employee contact information
- Clearance number
- Clearance circuit / apparatus
- Devices tagged



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23b. **Awaits** further instructions from System Manager.

ATTENTION

Power Director will not be issued the "BDR Code" until clearance has been released.

24. **Grants** permission to Class "A" employee to test circuit / apparatus de-energized.

25. **Records** time permission given.

138 kV ground switch checked closed by: N/A Location: _____ at: _____ ☐ AM ☐ PM
Randy Rhoads Permission to test (circuit/apparatus) de-energized at: 9:25 ☒ AM ☐ PM
Employee tested (circuit/apparatus) de-energized at: _____ ☐ AM ☐ PM

26. **Records** time circuit / apparatus tested de-energized by Class "A" employee.

138 kV ground switch checked closed by: N/A Location: _____ at: _____ ☐ AM ☐ PM
Randy Rhoads Permission to test (circuit/apparatus) de-energized at: 9:25 ☒ AM ☐ PM
Employee tested (circuit/apparatus) de-energized at: 9:40 ☒ AM ☐ PM

27. **Issues** clearance to Class "A" employee with permission to ground and time effective.

- Includes clearance No., day, date and time clearance issued

Clearance No: 101 Day: Monday Date: March 02, 2020 To: Randy Rhoads

Power has been removed from the following circuit/apparatus:

6401 (12 kV) Trolley Circuit Breaker including the Lightning Arrester at Sub 04 Paoli

Permission to ground above circuit/apparatus: Time effective: 9:46 ☒ AM ☐ PM Clearance repeated correctly at: _____ ☐ AM ☐ PM

No. of Grounds applied: _____ Power Director: _____

Clearance Issued (Print/ Sign)

Location of Grounds: _____



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28. **States** "clearance repeated correctly" by Class "A" employee receiving clearance with time.

Clearance No: 101 Day: Monday Date: March 02, 2020 To: Randy Rhoads

Power has been removed from the following circuit/apparatus:

6401 (12 kV) Trolley Circuit Breaker including the Lightning Arrester at Sub 04 Paoli

Permission to ground above circuit/apparatus: Time effective: 9:46 ☒ AM ☐ PM Clearance repeated correctly at: 9:46 ☒ AM ☐ PM

No. of Grounds applied: _____ Power Director: _____

Clearance Issued (Print/ Sign)

Location of Grounds: _____

29. **Prints** and **signs** name after clearance issued.

Clearance No: 101 Day: Monday Date: March 02, 2020 To: Randy Rhoads

Power has been removed from the following circuit/apparatus:

6401 (12 kV) Trolley Circuit Breaker including the Lightning Arrester at Sub 04 Paoli

Permission to ground above circuit/apparatus: Time effective: 9:46 ☒ AM ☐ PM Clearance repeated correctly at: 9:46 ☒ AM ☐ PM

No. of Grounds applied: _____ Power Director: Ozzy Osbourne / Ozzy Osbourne

Clearance Issued (Print/ Sign)

Location of Grounds: _____

30. **Repeats** and **records** number and location of all grounds applied, or to be applied if known, as reported by Class "A" employee.

Clearance No: 101 Day: Monday Date: March 02, 2020 To: Randy Rhoads

Power has been removed from the following circuit/apparatus:

6401 (12 kV) Trolley Circuit Breaker including the Lightning Arrester at Sub 04 Paoli

Permission to ground above circuit/apparatus: Time effective: 9:46 ☒ AM ☐ PM Clearance repeated correctly at: 9:46 ☒ AM ☐ PM

No. of Grounds applied: 2 Power Director: Ozzy Osbourne / Ozzy Osbourne

Clearance Issued (Print/ Sign)

Location of Grounds: 6401 feeder between F & T disconnects



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For a clearance release by the Class "A" employee on a (12 kV) trolley circuit breaker including lightning arrester, the **Power Director**:

31. **Repeats** and **records** number and location of all grounds removed as reported by Class "A" employee.

Location of Grounds: 6401 feeder between F & T disconnects

No. of Grounds removed: 2

Clearance No: _____ Day: _____ Date: _____ Employee: _____

Reports work completed, all personnel clear, grounds ☐ Removed ☐ NOT Removed from following circuit/apparatus: (read body of clearance)

☐ OK ☐ NOT OK to energize at: _____ ☐ AM ☐ PM ☐ Energized ☐ NOT Energized at: _____ ☐ AM ☐ PM

32. **Instructs** Class "A" employee to proceed with clearance release.

33. **Confirms** clearance No., day, date, Class "A" employee name, grounds removed included in clearance release.

34. **Gives** time clearance is OK to energize per Class "A" employee.

35. **Repeats** clearance release information back to Class "A" employee.

Location of Grounds: 6401 feeder between F & T disconnects

No. of Grounds removed: 2

Clearance No: 101 Day: Monday Date: March 02, 2020 Employee: Randy Rhoads

Reports work completed, all personnel clear, grounds ☒ Removed ☐ NOT Removed from following circuit/apparatus: (read body of clearance)

☒ OK ☐ NOT OK to energize at: 2:00 ☐ AM ☒ PM ☐ Energized ☐ NOT Energized at: _____ ☐ AM ☐ PM

36. **Requests** "BDR code" from Class "A" employee who released clearance.

37. If "BDR code" text message not received by Class "A" employee:

- 37a. **Establishes** positive contact with System Manager and **provides** relevant information including:

- Class "A" employee name
- Class "A" employee contact information
- Clearance number
- Clearance circuit / apparatus
- Devices tagged

- 37b. **Awaits** further instructions from System Manager.



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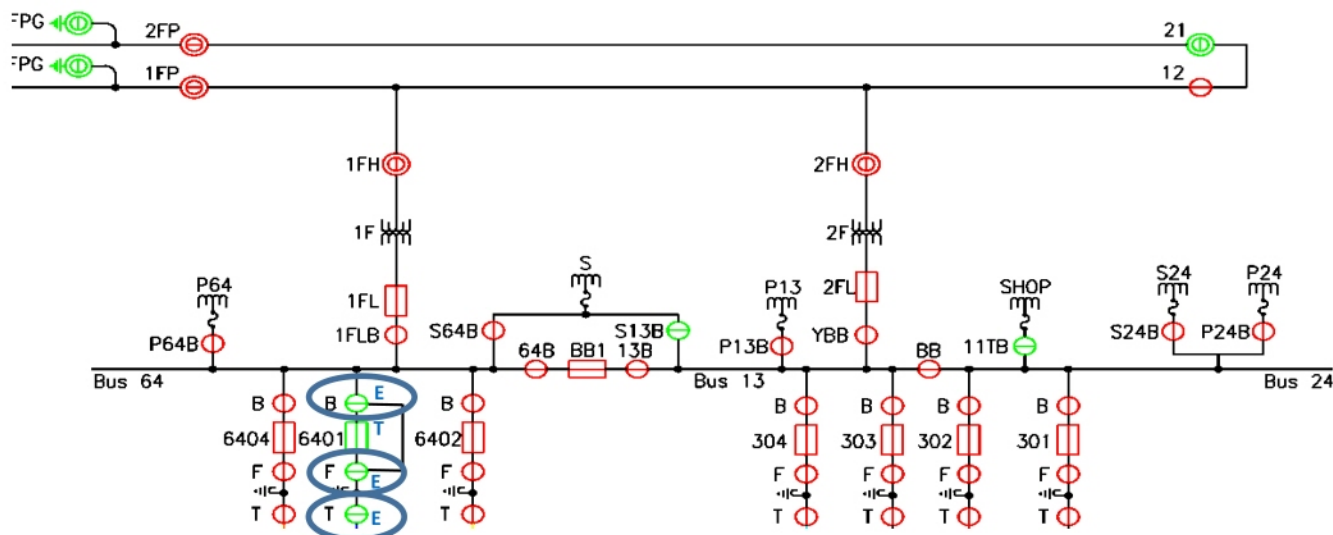
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38. **Issues** following switching orders to Class "A" employee:

- Check Open 6401 trolley circuit breaker at Sub 04 Paoli
- Remove lock and tag. Close 6401 "B&F" and "T" disconnects. Check close and lock close

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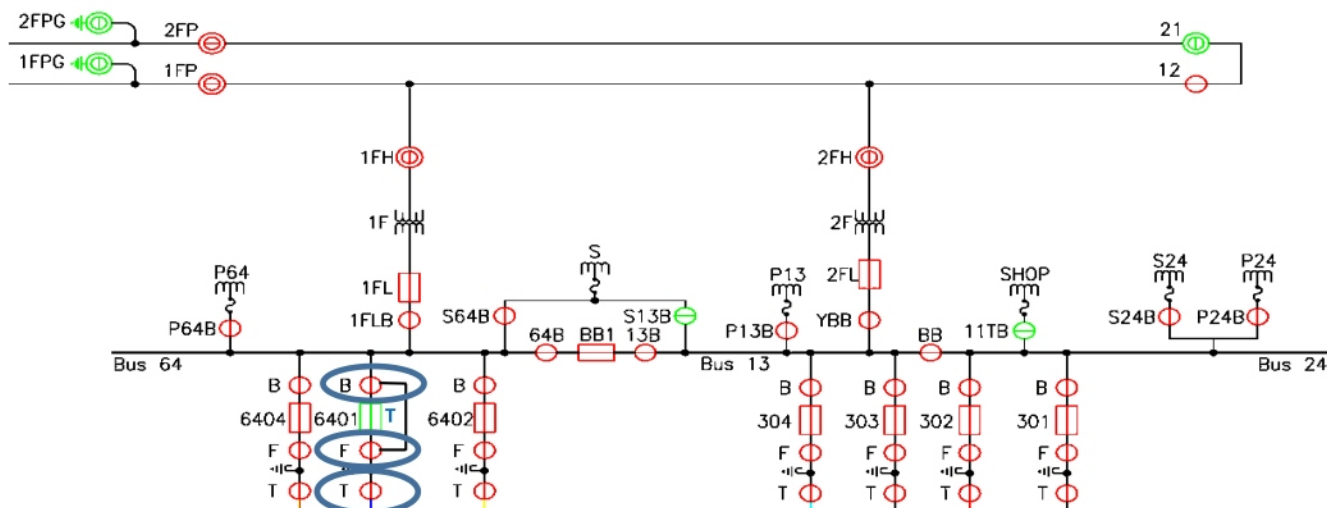


39. **Places** 3RD mark (/) to confirm switching orders given to Class "A" employee.

Location	Device			Opened		Tagged		Tag Removed		Closed	
	Switch	Breaker	Air Break	Time:	Date:	Time:	Date:	Time:	Date:	Time:	Date:
S04 Paoli		6401	X	9:07am	03.02.20	9:07am	03.02.20				
"	6401 B&F	X	/	9:20am	03.02.20	9:20am	03.02.20				
"	6401 T	X	/	9:20am	03.02.20	9:20am	03.02.20				

40. **Removes** EEPs tags and **closes** "B & F" and "T" disconnects.

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41. **Places** 4TH mark (\) to confirm switching orders completed by Class "A" employee.
42. **Repeats** switching orders as performed by Class "A" employee.
43. **Records** time and date switching performed.

[illegible]

44. **Checks and records** time clearance was energized.

Location of Grounds: **6401 feeder between F & T disconnects**

No. of Grounds removed: 2

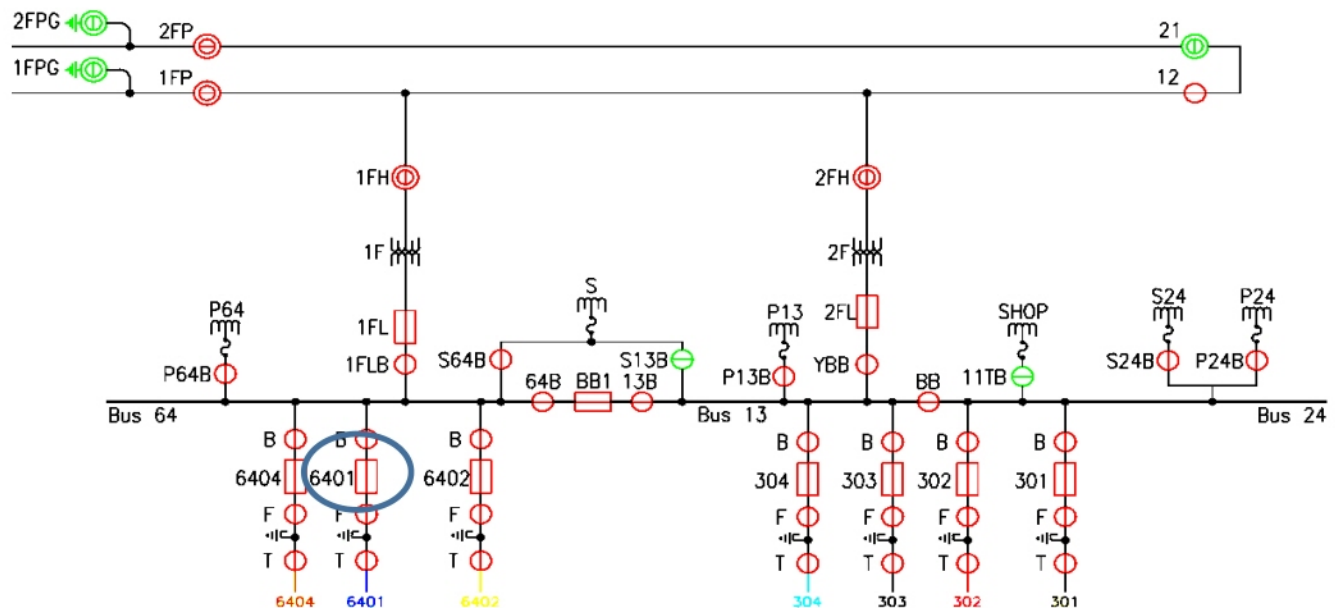
Clearance No: 101 Day: Monday Date: March 02, 2020 Employee: Randy Rhoads

Reports work completed, all personnel clear, grounds ☒ Removed ☐ NOT Removed from following circuit/apparatus: (read body of clearance)

☒ OK ☐ NOT OK to energize at: 2:00 ☐ AM ☒ PM ☒ Energized ☐ NOT Energized at: 2:18 ☐ AM ☒ PM

45. **Confirms** with substation personnel in clear prior to closing trolley circuit breaker.
46. **Removes** tag and **closes** trolley circuit breaker.

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47. **Places** 2nd mark (x) to confirm operation.

48. **Records** time and date tag removed, and breaker closed.

Location	Device			Opened		Tagged		Tag Removed		Closed	
	Switch	Breaker	Air Break	Time:	Date:	Time:	Date:	Time:	Date:	Time:	Date:
S04 Paoli		6401 XX		9:07am	03.02.20	9:07am	03.02.20	2:29pm	03.02.20	2:29pm	03.02.20
"	6401 B&F	XX		9:20am	03.02.20	9:20am	03.02.20	2:18pm	03.02.20	2:18pm	03.02.20
"	6401 T	XX		9:20am	03.02.20	9:20am	03.02.20	2:18pm	03.02.20	2:18pm	03.02.20

49. If tie switch was closed to back feed circuit:

49a. **Opens** tie switch.

50. If other end of trolley circuit extends outside of your operating zone:

50a. **Notifies** individual who has jurisdiction over affected circuit that power restored.

51. If trolley circuit is single-end and no tie switch available:

51a. **Releases** plate order to individuals who has jurisdiction over affected circuit.

52. **Records** N/A for areas that don't pertain to clearance.

Train Dispatcher/ Others

Zone 8 PD Plate: **N/A** Notified: **2:35** ☐ AM ☒ PM Released: ☐ AM ☐ PM

Plate: ☐ AM ☐ PM Released: ☐ AM ☐ PM

Plate: ☐ AM ☐ PM Released: ☐ AM ☐ PM

Plate: ☐ AM ☐ PM Released: ☐ AM ☐ PM

N/A Notified: ☐ AM ☐ PM Permission: ☐ AM ☐ PM Completed: ☐ AM ☐ PM

Signal Interruption

Load Dispatcher: **N/A** Permit No. ☐ AM ☐ PM Released: ☐ AM ☐ PM Completed: ☐ AM ☐ PM

Power Director: ☐ AM ☐ PM

Clearance Completed (Print/ Sign)

53. **Prints** and **signs** name after clearance completed.

Train Dispatcher/ Others

Zone 8 PD Plate: **N/A** Notified: **2:35** ☐ AM ☒ PM Released: ☐ AM ☐ PM

Plate: ☐ AM ☐ PM Released: ☐ AM ☐ PM

Plate: ☐ AM ☐ PM Released: ☐ AM ☐ PM

Plate: ☐ AM ☐ PM Released: ☐ AM ☐ PM

N/A Notified: ☐ AM ☐ PM Permission: ☐ AM ☐ PM Completed: ☐ AM ☐ PM

Signal Interruption

Load Dispatcher: **N/A** Permit No. ☐ AM ☐ PM Released: ☐ AM ☐ PM Completed: ☐ AM ☐ PM

Power Director: **Ozzy Osbourne / Ozzy Osbourne**

Clearance Completed (Print/ Sign)

**SCA-1 APPLYING AND REMOVING ENHANCED EMPLOYEE PROTECTION SYSTEM (EEPS) TAGS****1.0 INTRODUCTION**

The Enhanced Employee Protection System (EEPS) is an electronic means of enhancing clearance protection to Class "A" employees and personnel working under a clearance. The Class "A" employee requesting the clearance must possess a company issued cell phone prior to receiving a clearance from the Power Director.

The Power Director will apply (EEPS) tags to all manually or remotely operated energy isolating devices. The Class "A" employee will be given a four-digit PIN (BDR-blocking device release code) upon doing so. The Class "A" employee will verify the blocking points are complete and correct for clearance limits via BDR EEPS message. The Power Director will notify the Class "A" employee to confirm receipt of the EEPS BDR code.

When the Class "A" employee releases the clearance to the Power Director, the protected employee must first provide the Power Director their individual EEPS BDR code requiring both the Power Director and Class "A" employee in the field to simultaneously lift a block on a device. Only when the Class "A" employee's individual BDR is received will the Power Director be able to remove the blocking from devices providing protection.

By adding the ability to lift a block from a device from employees operating under it's protection and not solely on the Power Director in the office, EEPS adds a layer of protection for Electric Traction employees and field personnel working in electrified territory, further enhancing the Electric Traction's efforts to safeguard against worker injuries and fatalities.

2.0 TASK OBJECTIVE

Establish a zone of protection using the Enhanced Employee Protection System (EEPS) technology. Apply EEPS electronic tags to all manually or remotely operated energy isolating devices for clearance requested or transfer; then remove tag after clearance release.

3.0 RECOMMENDED CONDITIONS

This task should be performed during the performance of any of the following:

- Switching instructions to de-energize or re-energize circuits or apparatus
- Issuing and releasing clearance
- Releasing clearance temporary/ re-issue clearance
- Transferring a clearance between Class "A" employees
- Transferring a clearance to/ from the Power Director Office

4.0 REFERENCES

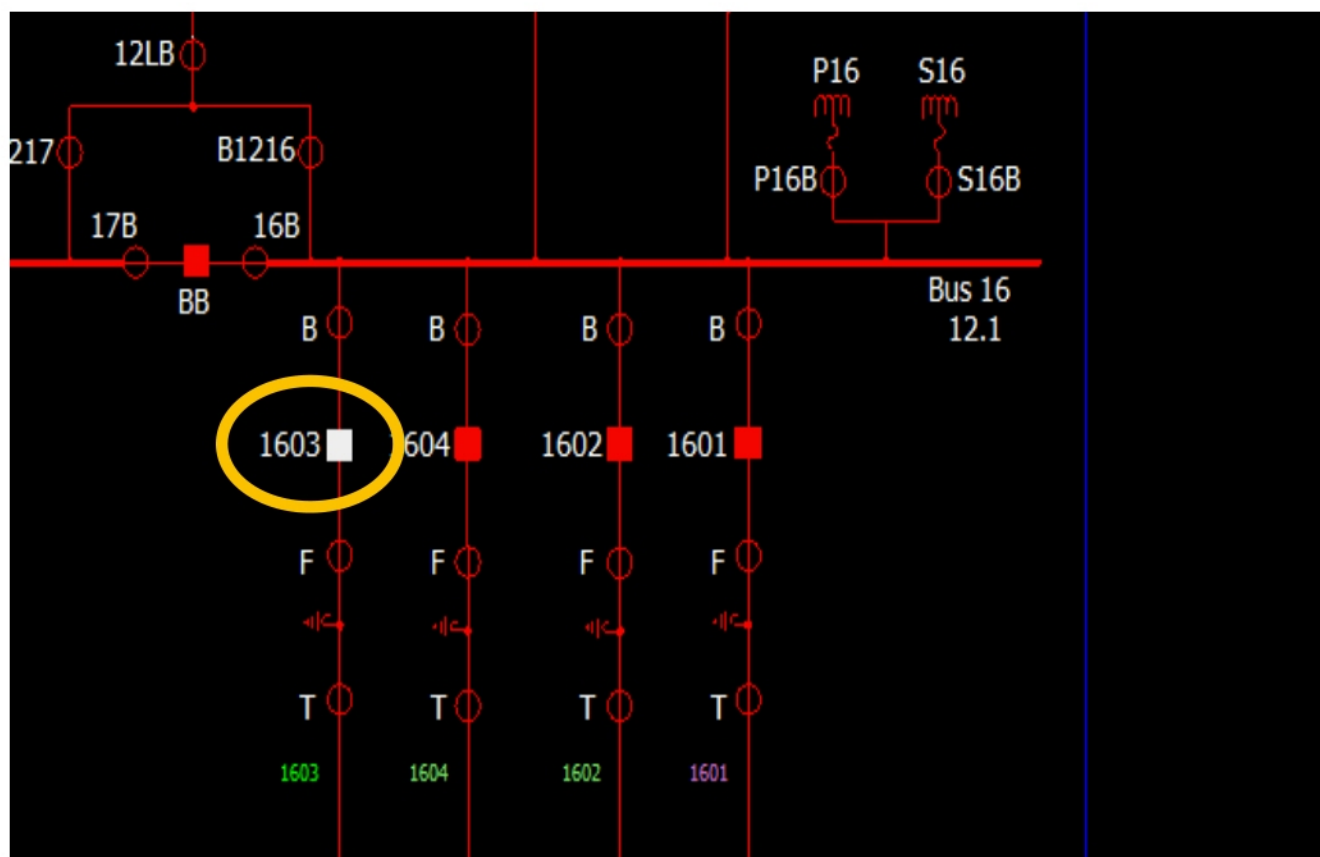
- Power Director Clearance Form (NEC.84)
- SOI.203 Voltage Testing & Verification Procedure

- SOI.211 Electrical Clearance Procedure
- FAR-4 Maintaining Clearance Form (NEC.84)
- SCADA Operating System
- Power Sectionalizing Plate Diagram
- AMT.2 Electrical Operating Rules & Instructions
- Appendix A. Glossary
- Appendix B. Abbreviations & Acronyms

5.0 POWER DIRECTOR ACTION

When necessary to apply an EEPS electronic tag, the **Power Director**:

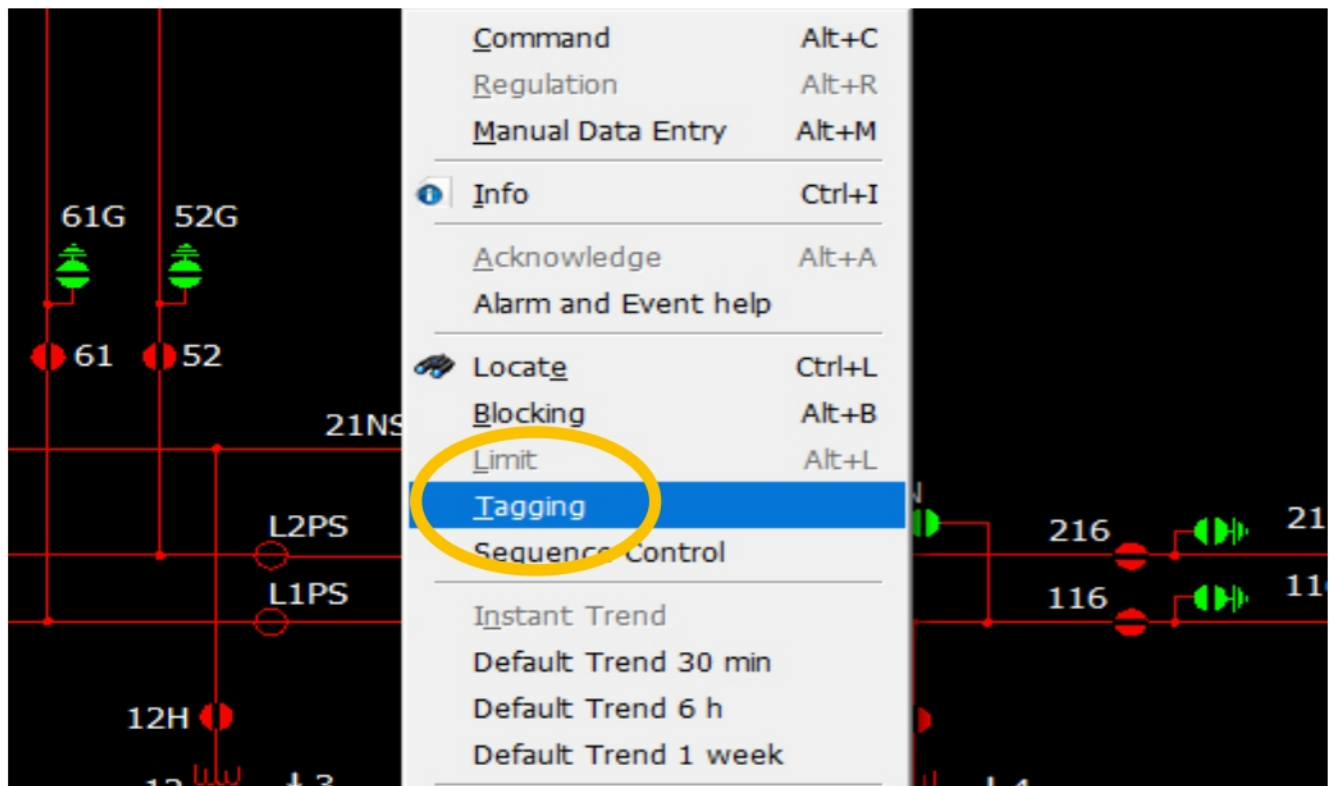
1. **Verifies** all required energy isolating devices are in open position for requested clearance.
2. **Selects** all manually or remotely operated energy isolating devices.



ATTENTION

Power Director must utilize group tag feature when applying multiple EEPS tags

3. Selects "Tagging" from menu.



4. Selects "Add" in tagging window.

Tagging 1

SUB-16__ 12.KV_1603_CB

Type	Date & Time	Operator	Job Id	Worker's Name	Comment

Modify...

Delete

Add...

☐ Bypass

Close

Help

ATTENTION

All selected devices will be listed on left side of tagging window when utilizing group tag feature.

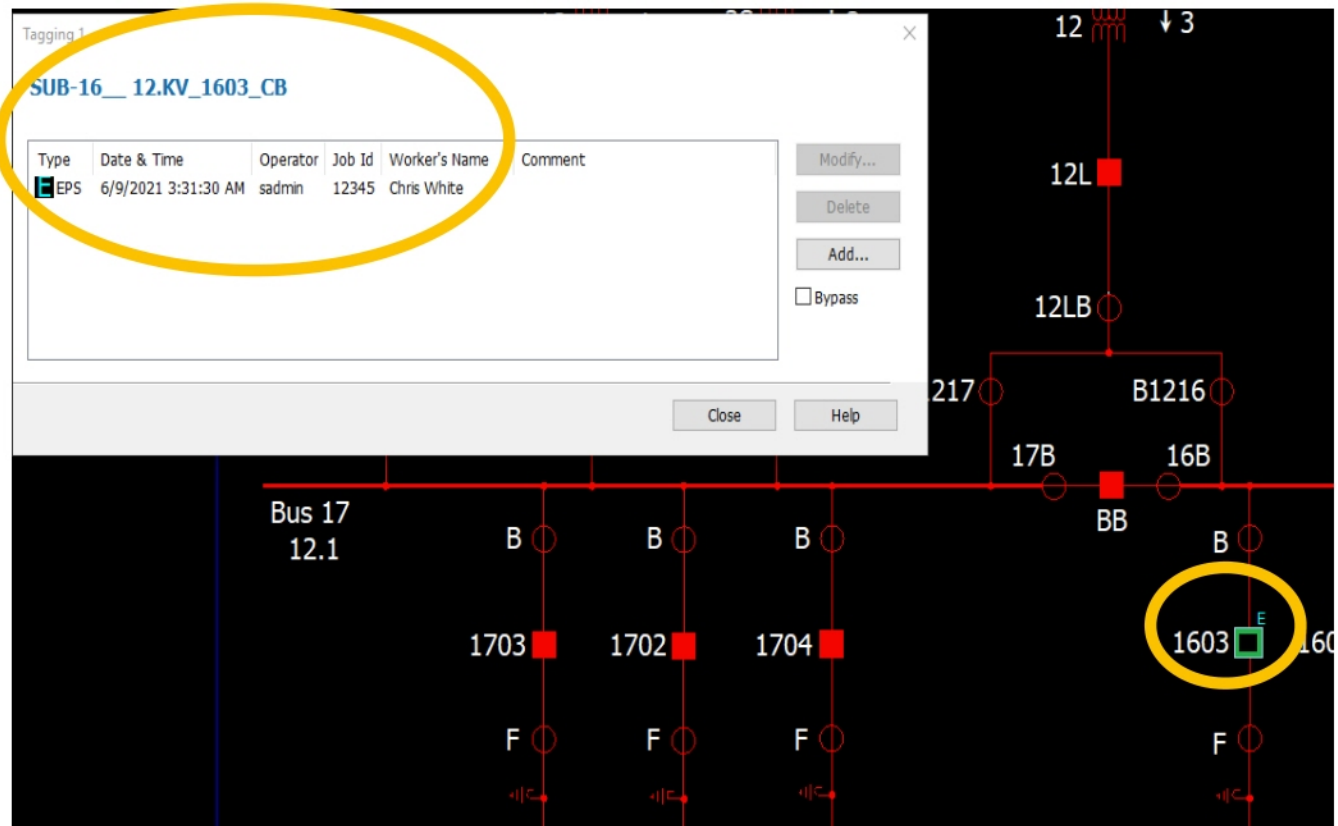
5. **Selects** "EPS" in add tag window.
6. **Enters** clearance no. in "Job ID" box.
7. **Selects** Class "A" employee receiving clearance in "Worker Name" drop down box.
8. **Selects** "OK" at bottom of add tag window.

The screenshot shows the 'Add Tag 1' window. The 'Type:' dropdown menu is open, showing options: WWP, OUTS, LINC, EPS (highlighted with a yellow circle), and INFO. Below this is a 'Comment:' text area. The 'Job Id:' field contains '123456' (highlighted with a yellow circle). The 'Worker Name:' dropdown menu is open, showing a list of names: Cesar Monagas, Chris White, and John Kozenko (highlighted with a yellow circle). At the bottom, the 'OK' button is highlighted with a yellow circle, next to a 'Cancel' button.

ATTENTION

Must utilize drop-down menu to select "worker name".
Free typing name will result in BDR code error.

9. **Verifies** EPS tag is shown on tagging window.
10. **Selects** tagged device and **returns** to tagging menu.
11. **Verifies** EPS tag applied to device on SCADA display.



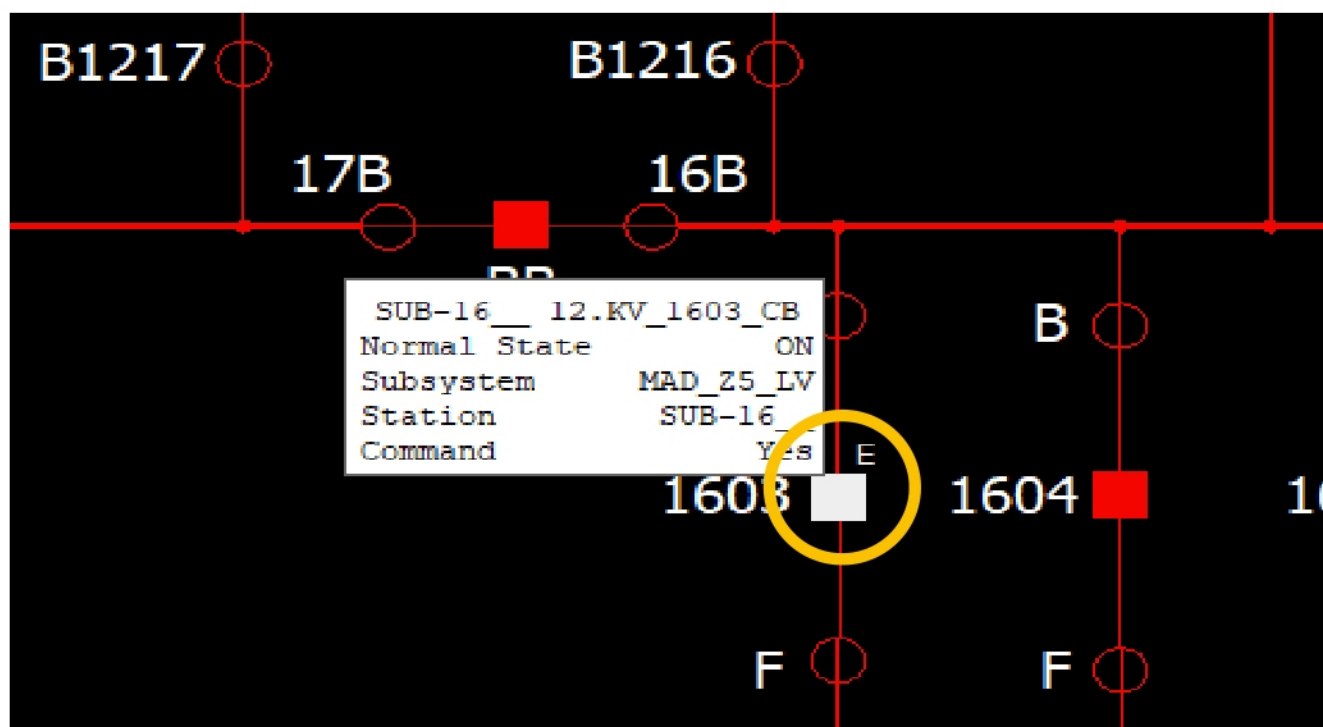
12. **Confirms** receipt of "BDR code" with Class "A" employee.
13. If "BDR code" is not received by Class "A" employee:
 - 13a. **Establishes** positive contact with System Manager on duty and **provides** relevant information including:
 - Class "A" employee name
 - Class "A" employee contact information
 - Clearance number
 - Clearance circuit / apparatus
 - Devices tagged
 - 13b. **Awaits** further instructions from System Manager.

ATTENTION

Power Director will not be issued the "BDR Code" until clearance has been released.

When necessary to remove an EPS electronic tag, the **Power Director**:

14. **Requests** "BDR code" from Class "A" employee who released clearance.
15. If "BDR code" is not received by Power Director:
 - 15a. **Establishes** positive contact with System Manager on duty and **provides** relevant information including:
 - Class "A" employee name
 - Class "A" employee contact information
 - Clearance number
 - Clearance circuit / apparatus
 - Devices tagged
 - 15b. **Awaits** further instructions from System Manager.
16. **Records** "BDR code" in "remarks" section on form NEC-84.
17. **Selects** device to start tag removal process.

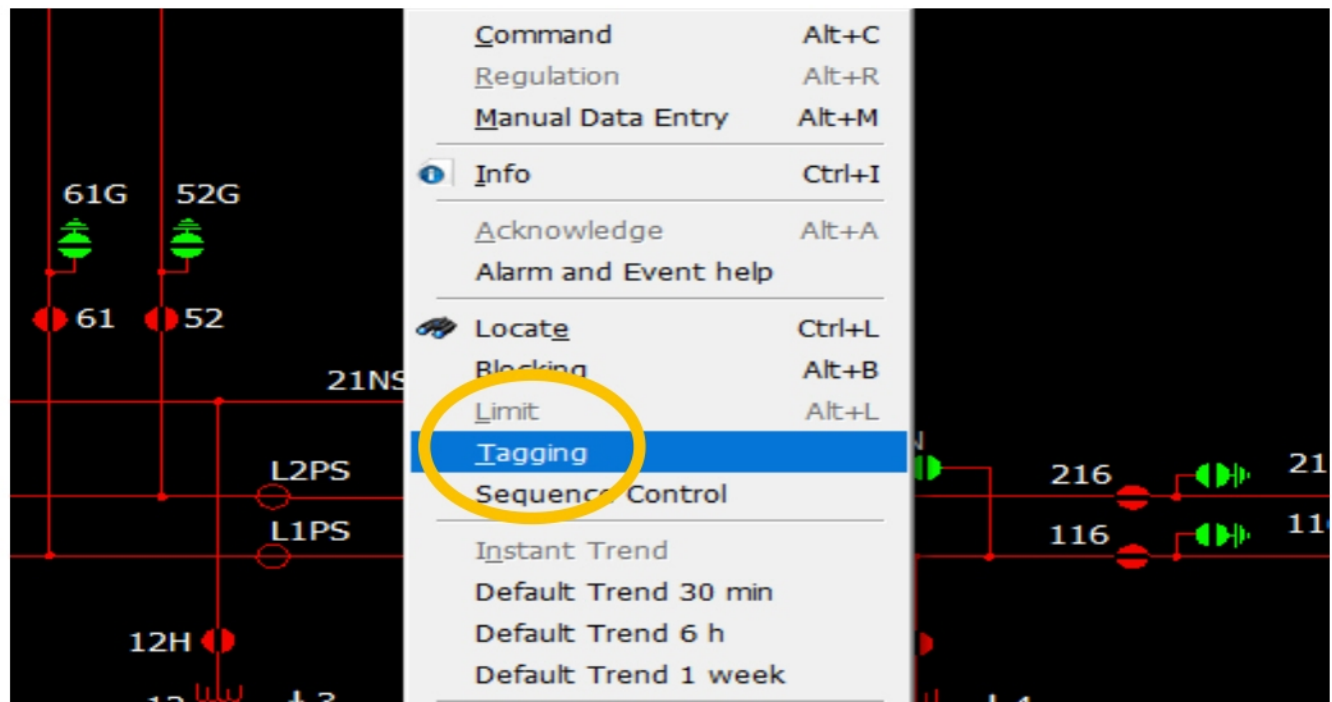


ATTENTION

Power Director will not request the "BDR Code" until clearance has been released.



18. **Selects** "Tagging" from menu.



19. **Selects** desired EPS tag from list in tagging window.

20. **Selects** "Delete" on right side of tagging window.

Tagging 1

SUB-16__ 12.KV_1603_CB

Type	Date & Time	Operator	Job Id	Worker's Name	Comment
EPS	6/9/2021 3:39:40 AM	sadmin	12345	Chris White	

Modify

Delete

Add

☐ Bypass

Close

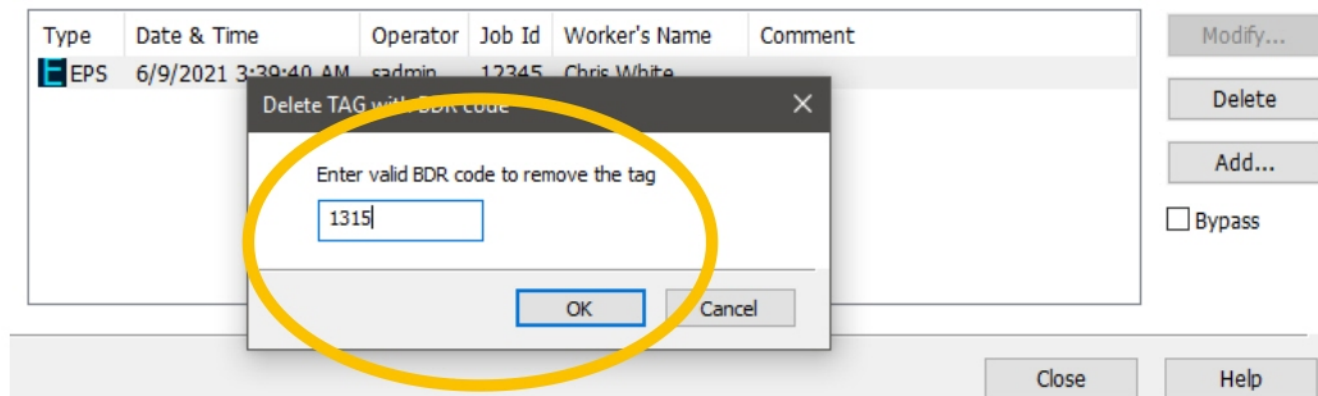
Help

21. **Enters** valid BDR code to remove tags in "Delete Tag" window.

22. **Select** "OK" after code is entered.

Tagging 1

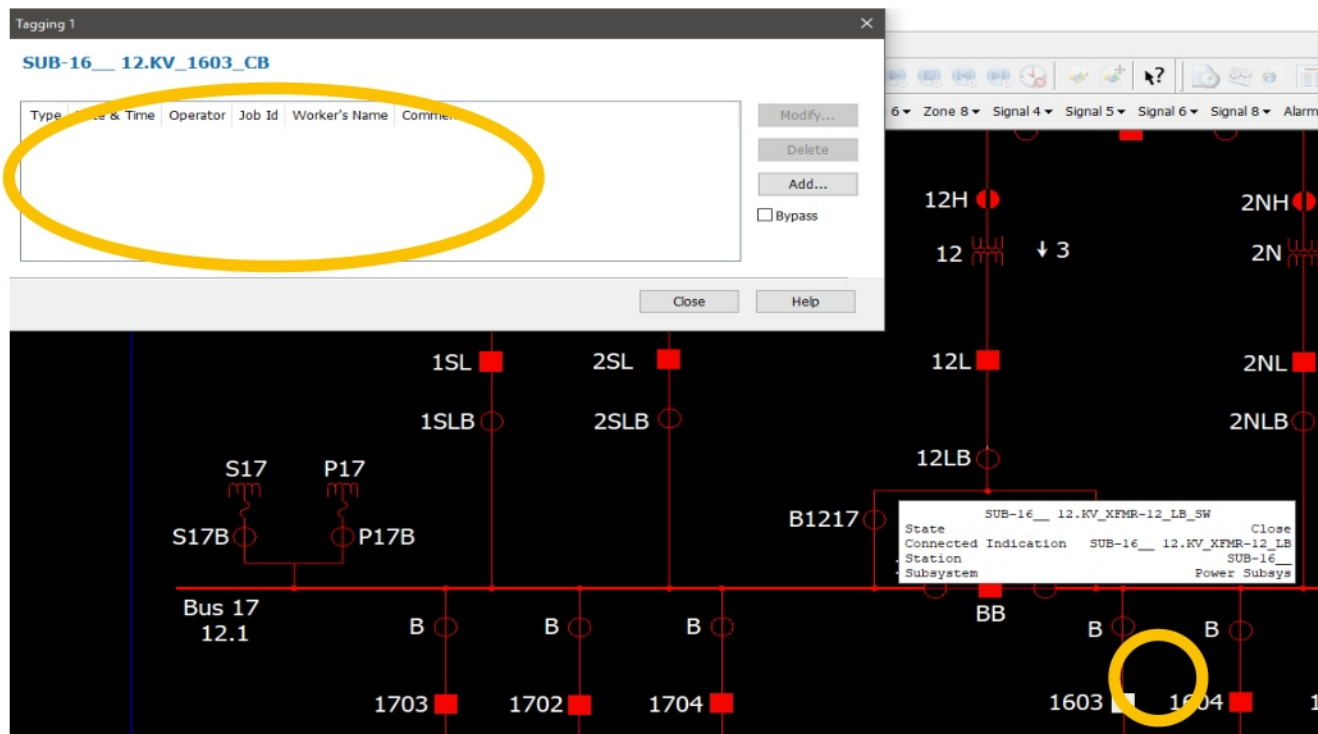
SUB-16__ 12.KV_1603_CB



23. **Verifies** EPS tag is removed on tagging window.

24. **Selects** device and **returns** to tagging menu.

25. **Verifies** EPS tag removed from device on SCADA display.



ATTENTION

A valid "BDR code" must be entered to remove EPS tag.



APPENDIX A. GLOSSARY

AC HOLD: A term to describe the restriction on the movement of AC electric trains or engines within a specified area. Generally issued by the Amtrak Load Dispatcher or Power Director to a Train Dispatcher.

ALTERNATING CURRENT (AC): The current flows in one direction then reverses and flows in the opposite direction.

APPARENT POWER: Real power (megawatt) is used to supply energy for work, heat, and light; and reactive power (Mvar) is used to supply energy to magnetic fields. Since both types of energy are flowing on the system together, they can be combined to find the total energy flow. This total energy flow (the product of voltage and current) is called apparent power and has units of volt-amperes. Common units in operation of the power system are kVA and MVA.

ARC: A luminous and potentially destructive flash or flame in or about the wires, third rail, or electric apparatus caused by the passage of electric current through the air.

AUTHORIZED: Permission to work on or about an electrical circuit, apparatus, or equipment or given permission to enter substations, frequency converter stations, or electrical enclosures.

AUTHORIZED WORK AREA: The area established by the Class "A" employee where work may be performed.

AUTO DROP: A feature that will automatically lower the pantograph when the air system to the pantograph has been compromised.

AUTOMATIC BLOCK SIGNALING: Automatic block signaling, or ABS, is a railroad communications system that consists of a series of signals between interlockings with number plates that divide a railway line into a series of sections, or "blocks". The system controls the movement of trains between the blocks using automatic signals.

AUTOMATIC TRAIN CONTROL: Wayside equipment detects the presence of trains or other speed-limiting factors and sends electronic commands dictating the maximum speed a following train may operate through the rails. These signals are picked up by equipment on a train and compares it to the actual speedometer reading. If the actual speed exceeds the maximum allowed speed, visual and audio displays alert the engineer to lower his speed. If the engineer fails to stop or reduce speed, a penalty full stop is imposed.

AUTORECLOSE: A feature of the electrification between New Haven and Boston. This feature will attempt to automatically close a trolley circuit breaker one time upon fault.

AUTOTRANSFORMER: A power transformer with only one winding that is used to boost voltage.

AUTOTRANSFORMER FEEDER: A feeder adjacent to the catenary that utilizes autotransformers to maintain the overhead catenary system voltage at selected points.

AUXILIARY WIRE: A solid wire suspended from the messenger wire to which the contact wire is attached.



BACK PILOT: A term used by Utility Operators to describe potential on a transformer.

BALANCE WEIGHT ASSEMBLY: A system of cables, pulleys and weights at the end of a tensioning section used to maintain constant in the overhead catenary system.

BELL TEMPERATURE ALARM (BTA): An alarm received when transformer windings heat up and reach a predetermined temperature value. It is necessary that the transformer be taken offline in order to minimize damage to equipment caused by overheating.

BRAKING CHOPPER: are used in the DC voltage circuits of frequency converters to control voltage when the load feeds energy back to the intermediate circuit. This arises, for example, when a magnetized motor is being rotated by an overhauling load and so functions as a generator feeding power to the DC voltage intermediate circuit.

BREAKER AND A HALF SCHEME: Developed from a ring bus arrangement, three breakers are connected between two main buses. The middle circuit breaker is shared by both the circuits. Richmond converter station's 138 kV buses are a breaker and a half scheme.

BLACKSTART RESOURCE: A generating unit and its associated set of equipment which has the ability to be started without support from the system or is designed to remain energized without connection to the system, with the ability to energize a bus.

BROKEN PANTOGRAPH/CARBON ALARM (BPA): An alarm generated when the air system to the pantograph has been compromised.

BUS BREAKER/ BUS TIE BREAKER (BB / BT): A circuit breaker that is positioned to connect two individual substation bus configurations.

BUS JUMPER: A cable used to transmit high voltage power between pantographs and/or one unit of electric equipment to another.

CAPACITANCE: A circuit element which stores electrical energy in the form of a static electrical charge.

CA RELAY: A relay activation found on both step-up and step-down transformers. Indicates a possible fault with the transformer. Both the high side switch and low side breaker will open. It cannot be re-energized without performing a visual inspection and dole test.

CASCADING: The uncontrolled successive loss of system elements triggered by an incident at any location. Cascading results in widespread electric train service interruption.

CATENARY ISOLATION SYSTEM: A system used to de-energize and ground the catenary at terminal or service and inspection location, made up of catenary disconnect switches and catenary ground switches.

CIRCUIT: The complete path over which electric current is transmitted from and returned to its source.



CIRCUIT BREAKER/ INTERRUPTER (CB): A device which normally operates automatically under conditions of overload, short circuit, or by remote control to energize or de-energize transmission lines, signal power lines, overhead catenary system, third rail, or primary circuits on electric equipment so equipped.

- a. **AIR:** Utilizes compressed air as arc quenching medium to exterminate the arc produced when the contacts are separated.
- b. **OIL:** The arc is drawn in oil to dissipate the heat and extinguish the arc; the intense heat of the arc decomposes the oil, generating a gas whose high pressure produces a flow of fresh fluid through the arc that furnishes the necessary insulation to prevent a restrike of the arc.
- c. **VACUUM:** Utilizes a vacuum to extinguish arcing when the circuit breaker is opened and to act as a dielectric to insulate the contacts after the arc is interrupted.
- d. **SULFUR HEXAFLUORIDE:** An inorganic, colorless, odorless, and non-flammable gas. SF6 primary use is in the electrical industry as a gaseous dielectric medium for various voltage circuit breakers, switchgear and other electrical equipment, often replacing oil filled circuit breakers that can contain harmful PCBs.

CLASS "A": Linemen, Substation Electricians, Third Railmen and C&S employees who are trained and qualified to provide protection services as well as work on or about the electrification system.

CLASS "A" ET TRAINEE: ET Trainees who have passed their 12-month test and Class "A" qualification

CLASS "A" QUALIFIED LIST: A list of employees qualified in a defined territory to receive clearances. The Assistant Division Engineer - Electric Traction maintains the current list of Class "A" employees. The Assistant Division Engineer – C&S maintains the current list of Class "A" C&S employees.

CLASS "B": Linemen, Substation Electricians, Third Railmen and C&S employees who are trained and qualified to provide protection services as well as work on or about the electrification system.

CLASS "C": Employees qualified to perform work in electrified territory.

CLEARANCE: The procedure when it is determined that power must be removed from circuits or apparatus in electrified territory as governed by minimum approach distances.

CLEARANCE FORM: A document outlining the procedure when it is determined that power must be removed from circuits or apparatus in electrified territory as governed by minimum approach distances.

CLEARANCE ISSUE: A step in the clearance procedure when the Power Director transfers authority of designated circuits or apparatus to the Class "A" employee in charge of providing protection.

CLEARANCE NUMBER: A specific, identifying number assigned to a clearance.



CLEARANCE RELEASE: A step in the clearance procedure when the Class "A" employee in charge releases authority of designated circuits or apparatus to the Power Director.

CLEARANCE REQUEST: The process initiated by the Class "A" employee to the Power Director describing relevant information regarding the designation of circuits or apparatus to be de-energized.

CLEARANCE TRANSFER: The procedure followed when a clearance needs to be re-assigned. The Power Director speaks to both Class "A" employees and when satisfied with the exchange of information, transfers the clearance.

COLLECTOR HEAD ASSEMBLY: The part of the pantograph made up of a set of carbon strips and end horns connected to the main frame of the pantograph assembly by means of an apex.

CONTINGENCY: The unexpected failure or outage of a system component, such as a generator, transmission line, switch or other electrical equipment.

CO NEUTRAL RELAY: A relay activation only found on Step-Up Transformers except at Sub 42 Hackensack. Both the high side switch and low side breaker will open. It can be re-energized without performing a visual inspection or dole test.

CONTACT WIRE: The wire in the overhead catenary from which the pantograph collects current.

CONTINUITY JUMPER: An electrical connection in the overhead contact system; a short conductor installed to provide electrical continuity. A jumper capable of carrying full line current.

CONTRACTOR: Personnel employed to work on or near Amtrak property that have completed Amtrak's "Orientation for Contractor Safety Course".

CONTROL JUMPER: A cable or mechanically connected between electric equipment to transmit control power.

COUPLING: A device that connects a motor mechanism to the operating rod that controls the movement of the switch. Allows the motor mechanism to be disconnected from the operating rod for testing and maintenance.

CURRENT: The quantity of electricity which flows through a cross-section of a conductor during a unit of time.

CYCLO CONVERTER: The Cyclo Static Frequency Converter is a direct converter. In a single step, it converts three-phase 60 Hz voltages to a single-phase 25 Hz voltage. It "cuts and pastes" the three-phase voltage to develop the single-phase 25 Hz voltage. Jericho Park uses Cyclo Converters.

DC HOLD: A term to describe the restriction on the movement of DC electric trains or engines within a specified area. Issued by the Zone 1 Power Director to a Train Dispatcher.

DC LINK CONVERTER: The DC-Link Static Frequency Converter is a solid state (no moving parts) device that changes the operating frequency between two power system networks. It consists of three major components:



- A rectifier that transforms 60 Hz alternating power to direct current power.
- A DC circuit, commonly referred to as the DC-Link.
- An inverter that transforms the DC power to 25 Hz AC power.

Richmond and Sunnyside converter stations use DC link converters.

DEAD SECTION (DS): A de-energized section in the overhead catenary system. The limits are designated by dead section signs at locations specified in the Timetable.

DE-ENERGIZED (DANGEROUS TO LIFE): Electrical circuits or apparatus disconnected from the power sources are considered dangerous to life until tested de-energized and properly grounded.

DEMAND: The rate at which electric energy is delivered to or by a system, generally expressed in kilowatts or megawatts, at a given instant or averaged over any designated interval of time.

DISPATCH: The implementation of a command decision to move a resource or resources from one place to another.

DIRECT CURRENT (DC): The current flow is always in the same direction.

DISCONNECT SWITCH: A mechanical switching device, either motor or manually operated, used for isolating a circuit or apparatus from a source of electrical power.

DISTURBANCE: An unplanned event that produces an abnormal system condition.

DO NOT OPERATE TAG (NEC 105): A safety tag defining operating restrictions to an electrical apparatus.

DTMF (DUAL TONE MODULATED FREQUENCY) RADIO CONTROLLED TRACK SWITCHES: A radio activated dual control power switch system specifically for remotely controlling switches in yards or dark territory to improve train operation safety and efficiency.

DUAL INDICATION: (Zones 1, 2, 3) Both "open" and "closed" indicators (red and green lights lit) QEI device status color is magenta (Zone 1, 2, 3) means you don't know true status. Status Unknown (if no indication to QEI, device status purple).

ECONOMIC DISPATCH: The allocation of demand to individual generating units on line to effect the most economical production of electricity.

ELECTRIC EQUIPMENT: Locomotives and multiple unit cars operated by power received from the overhead catenary system or third rail.

ELECTRIC POWER: The rate at which electric energy is transferred by an electric circuit.

ELECTRIC TRACTION TRAINEE: Electric Traction employees that are working towards craft specific qualifications.

ELECTRIFIED TERRITORY: The portion of the railroad equipped for electric train operation.



EMERGENCY BUS: An alternate feed source for effecting outages to dedicated low rupture breakers. Sub 25A Union has an emergency bus configuration.

EMERGENCY CONDITION: A circumstance which presents a hazard to life, infrastructure or equipment that may interfere with train movement.

EMERGENCY RATING: The rating as defined by the equipment owner that specifies the level of electrical loading or output, usually expressed in megawatts or reactive power or other appropriate units, that a system, facility, or element can support, produce, or withstand for a finite period. The rating assumes acceptable loss of equipment life or other physical or safety limitations for the equipment involved.

END APPROACH: The gradual slope or incline of the rail at the beginning and end of each third rail section. This allows for the smooth transition of the third rail shoe.

ENERGIZED- LIVE (DANGEROUS TO LIFE): Electrical circuits or apparatus, connected to a power source.

ENERGY ISOLATION DEVICE: A physical device that physically prevents the transmission or release of energy. Energy isolating devices establish the zone of protection boundaries in accordance with clearance procedures.

ENHANCED EMPLOYEE PROTECTION SYSTEM (EEPS): An electronic means of enhancing clearance protection to Class "A" employees and personnel working under a clearance.

EQUALIZING JUMPER: (PORTABLE EQUALIZING JUMPER): A jumper connected from the messenger wire to the contact wire installed approximately 500' in constant tension overhead catenary system that carries current from the messenger to the contact wire.

EQUIPMENT RATING: The maximum and minimum voltage, current, frequency, real and reactive power flows on individual equipment under steady state, short-circuit and transient conditions, as permitted or assigned by the equipment owner.

FAULT: A physical condition that causes electrical equipment to fail to perform as designed.

FLASHOVER: An electric discharge through air around or over the surface of insulation, between objects of different potential, caused by placing a voltage across the air space that results in the ionization of the air space.

FORCED OUTAGE: A hardware failure in the generation, transmission, distribution or signal power system that results in the equipment being removed from service for emergency reasons. Forced outages typically occur due to unexpected component failure. Regularly scheduled shutdowns of equipment for routine maintenance do not qualify as a forced outage.

FORM D: A form containing written authorizations, restrictions, or instructions, issued by the Train Dispatcher to specified individuals.

FOUL TIME: Time that the track is to be obstructed (fouled).



FRAME SHIFT: A mechanism that allows the stator of the motor to rotate a defined number of degrees. This controls the phase angle between the voltage driving the motor and voltage produced by the generator.

FREQUENCY: The number of complete voltage or current cycles per second. Frequency is expressed as Hertz.

FREQUENCY CONVERTER: A set of equipment used to supply electrical power from one electrical system to another electrical system of a different frequency.

FREQUENCY CONVERTER STATION: A location where power is received from a local utility at 60 Hz and is converted to 25 Hz for distribution to Amtrak's transmission system.

GROUND CONNECTION: An approved electrical connection made to the rail return circuit or other earth potential that is used to protect personnel, equipment and property when work is performed in electrified territory.

GROUNDING SWITCH: A device that is closed to connect wires or electric apparatus mechanically to ground.

HIGH EQUIPMENT: Equipment that, when on top of, will place employee closer than 3 feet of the overhead catenary system.

HIGH SIDE SWITCH: A motor operated disconnect switch used to isolate or connect the primary side of a transformer.

HOME SIGNAL: Signals that govern the entrance of an interlocking.

HOOK TYPE DISCONNECT SWITCH: A mechanical switching device used to isolate a circuit or apparatus from a source of power. This type of disconnect is operated by placing the hook end of a switch pole into a ring provided on the movable blade of the switch.

HYDRO ELECTRIC GENERATING UNIT: A water source, usually a river or a series of streams, supplies water to a reservoir. Safe Harbor is the only generating station that supplies hydro power (direct 25 Hz) generation to Amtrak.

HUCKING: The process of connecting third rail sticks at its joints, end approaches and/or attaching high voltage cable to third rail, using a hydraulic gun. Bolts, washers, collars and splice bars are used to secure these joints upon pressure of the hydraulic gun.

IMPEDANCE: The measure of a circuit's total opposition to current flow.

IMPEDANCE BOND: A device which separates signal track circuits from traction return circuits by providing a path for traction return current around insulated block joints.

INSULATOR: A material, such as polymer or porcelain, of such low conductivity that the flow of current through it is negligible.



INSULATED TOOL: Tools used by AMT-2 Qualified Employees around electrified third rail, designed with wooden or fiberglass handles for protection against electric shock.

LATERAL/ SECONDARY FEED: An alternate power supply to temporarily energize a signal location or cut section secondary circuits from another signal location or cut section.

LIGHTNING ARRESTER (LA): A device component used on electric power systems to protect electrical apparatus from damaging effects of lightning

LIMITS OF A CLEARANCE: The points established by the switching procedures to de-energize an area defined by the body of the clearance.

LIVE LINE TOOLS: Insulated hand-held sticks for use on high voltage circuits.

LOAD: An end-use device that receives power from the electric system.

LOAD DISPATCHER (LD): The employee who monitors and regulates power demands for the 25 Hz electrification system.

LOCKOUT RELAY: When used in conjunction with signal equipment this relay has two positions.

- a. When in the locked-out position; removes the automatic and remote closing of the signal breaker.
- b. When in the reset position allows the signal breaker to close automatically when an under voltage condition is detected. Also allows remote closing of the signal breaker.

LOW D.O.: A term used by Safe Harbor to indicate low "dissolved oxygen levels" in the water. This has as effect on the Susquehanna River. Typically if this condition occurs, Safe Harbor will remove the Hydro units from service and provide generation with the frequency converter only.

LOW RUPTURE BREAKER: Usually found in switching stations, a low rupture breaker supplies the feed to a section of trolley. Controlled by the master breaker to trip for a fault on its trolley section.

LOW SIDE BREAKER: Protects the secondary side of the transformer from fault currents and overloads by opening when conditions reach a pre-determined value.

MAIN CIRCUIT BREAKER (MCB): A device located on electric equipment that interrupts the flow of power from the pantograph to the main power transformer.

MANUALLY OPERATED SWITCH: A switch operated by hand without using any other source of power.

MASTER BREAKER: Usually found in switching stations, a master breaker feeds a low rupture bus that contains several low rupture breakers. Relay protection trips the master breaker then the faulted low rupture breakers, then re-closes the master breaker when clear.

MESSANGER WIRE: A stranded cable attached to supporting structures from which the contact and/or auxiliary wires are suspended.



MINIMUM APPROACH DISTANCE (MAD): The closest distance personnel or equipment is permitted to approach an energized or de-energized but not grounded circuit or apparatus.

MIS-OPERATION: The failure of a protection system to operate as intended for protection purposes. Any of the following is a mis-operation:

- a. **FAILURE TO TRIP DURING FAULT:** A failure of a protection system to operate for a fault condition for which it is designed.
- b. **FAILURE TO TRIP OTHER THAN FAULT:** A failure of a protection system to operate for a non-fault condition for which it is designed, such as a power swing, undervoltage, overexcitation, or loss of excitation.
- c. **SLOW TRIP DURING FAULT:** A protection system that is slower than required for a fault condition if the duration of its operating time resulted in the operation of at least one other element's protection system.
- d. **SLOW TRIP OTHER THAN FAULT:** A protection system that is slower than required for a non-fault condition, such as a power swing, undervoltage, overexcitation, or loss of excitation, if the duration of its operating time resulted in the operation of at least one other element's protection system.
- e. **UNNECESSARY TRIP DURING FAULT:** An unnecessary protection system operation for a fault condition on another element.
- f. **UNNECESSARY TRIP OTHER THAN FAULT:** An unnecessary protection system operation for a non-fault condition.

MOTOR OPERATED AIR BREAK SWITCH (MOAB): A switch whose insulator stack upon which the disconnect switch is mounted is connected to a motor mechanism at the base of the switch. The switch is normally operated remotely. Used to sectionalize, tie, or isolate transmission line circuits.

MOTOR OPERATED SWITCH: A disconnect switch that is connected to a motor operated mechanism at the base of the switch. To open or close this disconnect switch the motor operator mechanism receives a power signal and turns the connecting rod, in the process simultaneously moving the switch blades out of the fixed jaw or fitting the switch blade into the fixed jaw.

MULTIPLE UNITS (MU): Electric equipment used by commuter railroads in local passenger service. Most units have a pantograph on each car. There are some units called married pairs that have one pantograph for two units.

NEGATIVE FEEDER- 25 KV (NEW ENGLAND DIVISION): A feeder adjacent to the catenary that utilizes autotransformers to maintain the catenary voltage at selected points.

NORMAL CLEARING: A protection system operates as designed and the fault is cleared in the time normally expected with proper functioning of the installed protection systems.



NORMAL RATING: The rating as defined by the equipment owner that specifies the level of electrical loading, usually expressed in megawatts or other appropriate units that a system, facility, or other element can support or withstand through the daily demand cycles without loss of equipment life.

OFF-PEAK: Those hours or other periods defined by Amtrak business practices or guides as periods of lower electrical demand.

ON-PEAK: Those hours or other periods defined by Amtrak business practices or guides as periods of higher electrical demand.

OPERATING GUIDELINE (OG): A document that identifies specific steps or tasks that should be taken by one or more specific operating positions within Amtrak to achieve specific operating goals. The steps presented in an Operating Guideline should be followed in the order they are presented, and should be performed by the positions identified. A document that lists the specific steps for a system operator to take in removing a specific transmission line from service is an example of an Operating Guideline.

OPERATING RESERVE: That capacity above firm system demand required to provide for regulation, load forecasting error, equipment forced and planned outages.

OPERATING VOLTAGE: The voltage level by which an electrical system is designated and to which certain characteristics of the system are related.

OPERATIONAL PLANNING ANALYSIS: An analysis of the expected system conditions for the next-day's operations. Expected system conditions include things such as load forecasts, generation output levels, and known system constraints (converter outages, equipment limitations etc.).

OPERATIONS SUPPORT PERSONNEL: Individuals who perform current day or next day outage coordination or assessments. Direct support of real-time operations for Amtrak's Electric Traction Department.

OVERHEAD CATENARY (CONTACT) SYSTEM (OCS): A system of wires suspended between poles and bridges supporting overhead wires.

- a. **FIXED TERMINATION:** A fixed system of wires suspended between poles and bridges supporting overhead wires.
- b. **CONSTANT TENSION:** A system of wires provided with balance weight tensioning devices to maintain constant tension.

PANTOGRAPH: A device located on top of electric equipment which collects electric power from the contact wire by means of a collector head assembly.

PARALLELING STATION: A substation located at controlled points along the territory where the catenary and feeder are connected through autotransformers to balance and maintain the overhead catenary voltage.



PEAK DEMAND: The highest hourly integrated net energy for load within an area occurring within a given period.

PERMIT: Issued by the Load Dispatcher granting permission to disconnect and isolate primary circuits and apparatus under the Load Dispatcher's direction.

PERSON IN CHARGE: The individuals being Amtrak employees or contractors whose designated responsibility is to supervise the work group afforded protection by the Class "A" employee. The Class "A" employee may also be the "Person in Charge".

PHASE BREAK (PB): A location in the overhead catenary system where overhead wires are arranged to provide an isolated section between different sources of power.

PHASE IN: A term used by the Load Dispatcher to reconnect portions of the electrified system after an outage or split phase condition.

PLANNED OUTAGE: Interruptions to the system prearranged on relatively short notice.

PLATE NUMBER: Obtained from the Plate Book, the Plate Number is the specific number assigned to a given plate. This number is used on the Plate Order to designate the track and define the limits covered by the Power Plate.

PLATE ORDER: A document which acknowledges that a section of the overhead catenary system or third rail may be de-energized. It graphically communicates this fact to all involved parties that electric trains or electric equipment are prevented from moving into the de-energized area.

POINT OF DELIVERY: A location that the transmission service provider specifies on its transmission system where an interchange transaction leaves or a load-serving entity receives its energy.

POLE PIECES: Determines the frequency in a motor-generator.

- There are 10 pole pieces on a 25 Hertz generator rotor.
- There are 24 pole pieces on a 60 Hertz motor rotor.
- $\frac{10}{24} \times 60 = 25$ Hertz

POTENTIAL TRANSFORMER: A transformer connected to a substation bus section used to provide voltage input to the 110V relay potential bus, and back pilot indication at step-up stations.
(Relay Protection Scheme)

POTENTIAL TRANSFORMER SELECTOR SWITCH: A three position selector switch (i.e.: 20 Bus, off, 19 Bus) found on the relay and control board in most substations that allows for the transfer of relay potential to a selected bus section. The normal configuration is such that the selector switch is pointing to the bus it is being fed from (i.e.: P19 on #19 Bus).

POWER DIRECTOR (PD): The employee in charge of power distribution. They manage the operations and sectionalizing of the Electric Traction power distribution, signal power, and 3rd rail systems within their assigned territory.



POWER DIRECTOR OPERATING ZONE: A geographical section of the Amtrak electrified system whose switching and monitoring operations are conducted under the direction of the Amtrak Power Director.

POWER FACTOR: The fraction or percent of the total energy flow that is being used for useful energy such as work, heat, or light.

POWER SECTIONALIZING PLATE: A diagram which indicates the area in which there are to be no electric train or electric equipment movement.

PROGRAMMABLE LOGIC CONTROLLER (PLC): is an industrial computer control system that continuously monitors the state of input devices and makes decisions based upon a custom program to control the state of output devices. PLCs can be found at Jericho Park, Richmond and Sunnyside converter stations.

QUALIFIED PERSON: An individual officially recognized as being trained and has successfully demonstrated ability to perform a particular job.

PROTECTION SYSTEM: Control circuitry associated with protective functions through the trip coil of circuit breakers or other interrupting devices. Protective relays which respond to electrical quantities.

RACK-OUT CIRCUIT BREAKER: A circuit breaker that may be completely removed from its enclosure for maintenance.

RAIL RETURN: The combination of rails, jumpers, impedance bonds and cables that provide an electrical return path from the train to the substation.

RATING: The operational limits of a transmission system element under a set of specified conditions.

REACTIVE POWER: It is the product of the voltage and the out-of-phase component of the current. Sometimes called volt-amperes-reactive (var), is associated with the reactance of the circuit. Reactive power regulates the voltage in the system.

REAL POWER: The portion of electricity that supplies energy to a load. Real power (megawatt) is the flow rate of a particular type of energy, called useful or working energy.

RELIABLE OPERATION: Operating the elements of the system within equipment and electric system thermal, voltage, and stability limits so that instability, uncontrolled separation, or cascading failures of such system will not occur as a result of a sudden disturbance or unanticipated failure of system elements.

REMOTE CONTROL BOARD: A switch panel used for the operation and supervision of Electric Traction equipment/apparatus.

REMOTE TERMINAL UNIT (RTU): Hardware that gathers system-wide real-time data from various locations for telemetry and remote control of field equipment to a centralized control center.

RESISTANCE: The opposition to electrical current flow. Measured in "ohms".



RING BUS CONFIGURATION: All breakers are arranged in a ring with circuits tapped between breakers. For a failure on a circuit, the two adjacent breakers will trip without affecting the rest of the system. A single bus failure will only affect the adjacent breakers and allow the rest of the system to remain energized. A breaker failure or breakers that fail to trip will require adjacent breakers to be tripped to isolate the fault. Lamokin Step-Up Yard is a ring bus configuration as well as Sub 40 Waverly.

138 kV BUS SECTION (ROOF BUS): That portion of the (138 kV) transmission system located in the substation between the air break switches, tie switches, and high side switches to which the power transformers connect.

ROTARY FREQUENCY CONVERTER: Rotating Frequency Converters are large motor generator sets consisting of a 60 Hz, three-phase motor with a 13.8 kV input that drives a 25 Hz, single-phase generator with an output of 13.2 kV. The mechanical energy of the motor drives a shaft coupled with the generator to produce the electrical energy required for distribution to the step-up yard. Lamokin, Safe Harbor and Metuchen converter stations use rotary frequency converters.

SCHEDULED OUTAGE: Routine interruptions planned well in advance such as those scheduled for routine maintenance or inspection of equipment.

SECONDARY FUSE: A fuse installed to protect the secondary side of a transformer. Removed to provide isolation for clearances.

SECTION BREAK: A location designed to provide a separation of circuits while allowing for a continuous collection of power from the overhead catenary system.

SECTIONALIZING SWITCH: Apparatus which is used to isolate or connect sections of the catenary, signal power or third rail.

SERVICE TRANSFORMER: A transformer connected to a substation bus used to provide station service power, such as lighting and control.

SERVICE TRANSFORMER SELECTOR SWITCH: A two position selector switch (i.e.: S20, S19) found on the relay and control board in most substations that allows for the transfer of station service power from a selected bus section. Traditionally configured so that the service is fed off the bus section represented by the substation location (i.e.: Sub 20 on S20).

SHIFT TURNOVER: A transfer of responsibility and information regarding the status of the system from the outgoing to incoming Load Dispatcher or Power Director.

SIGNAL BREAKER: A component of the signal power system with automatic and lock out features, strategically located to feed or tie into the signal power line.

SIGNAL CUT SECTION: A C&S Instrument house (CIH) between interlockings with no wayside signals. Serves as a repeater for signal circuits between wayside signal locations.



SIGNAL FLIP: A term used when the current feed to the signal line must be changed. This is a planned disruption to the signal feed arrangement between the Power Director and those having jurisdiction over the affected area.

SIGNAL INTERRUPTION: A term used when an unscheduled interruption to the signal line occurs due to faults and power losses causing a signal machine or signal breaker to trip. This would be a momentary loss of signals as signal feeds from other sources would be closed automatically or manually to re-energize the signal line.

SIGNAL LOCATION: A location that has wayside signals. This can be a home signal or automatic block signal location.

SIGNAL MACHINE: A motor-generator or static unit strategically located, generates power to supply the feed for the signal power system.

SIGNAL OUTAGE: A term used when signal line power is interrupted for a sustained period of time.

SILICON CONTROLLED RECTIFIER: A power electronic component that cuts and pastes the three-phase voltage to develop the single-phase 25 Hz voltage. Can be found at Amtrak's Jericho Park converter station.

SINGLE-PHASE TWO WIRE CIRCUIT: A single phase AC circuit supplied through two wires. As an example, the 25 Hz catenary is a single-phase two wire circuit. One wire is the trolley and the second wire is the rails.

SINGLE-PHASE THREE WIRE CIRCUIT: A single phase AC circuit consisting of three wires, one of which is identified as the neutral conductor. As an example, Northeast Division East (formerly the New England Division) 60 Hertz catenary system has three conductors. One conductor is the trolley wire, one conductor is the feeder wire, and the rails act as the neutral conductor.

SITUATIONAL AWARENESS: The ability to identify, process, and comprehend the critical elements of information pertaining to your job. More simply, it's knowing what is going on around you.

SOLID HOLD: A term to describe the restriction on the movement of all equipment within a specified area. Generally issued by the Power Director to a Train Dispatcher.

SPILLING: A term used by Safe Harbor to indicate too much water in the bay. Amtrak will generally take extra megawatts when this condition occurs.

SPINNING RESERVE: Unloaded generation that is synchronized and ready to serve additional demand.

SPLIT PHASE: A condition where one or more sources of generation are separated to create an island affect.

STABILITY: The ability of an electric system to maintain a state of equilibrium during normal and abnormal conditions or disturbances.



STANDARD OPERATING INSTRUCTIONS (SOI): Instructions for the Electric Traction Department to assist employees in the safe and efficient performance of their duties.

STATIC FREQUENCY CONVERTER: Uses power electronics technology to convert three-phase input voltages directly to a single-phase voltage operating at a different frequency. Jericho Park, Richmond Metuchen and Sunnyside converter stations use static frequency converters.

STATIC WIRE: The wire normally located on top of pole which protects conductors from lightning by providing a low resistance path to ground. Without a static wire, lightning induced voltage would otherwise build up on power line conductors during a lightning strike and cause damage.

STATUS UNKNOWN: (Zones 4, 5, 6 and 8 only): On SCADA, device status goes to a flashing blue indication. This means it is unknown if the device is open or closed. There are two variations of status unknown.

- a. **TRANSIT:** Indicates that neither indication points is being seen (open or closed). Removing DC control from the device is an example of a transit status.
- b. **MALFUNCTION:** Indicates that both indication points are being seen simultaneously (open and closed).

SUBSTATION: A location where power is received at high voltage and changed to required voltages and characteristics for distribution to the overhead catenary system, third rail, and other electric apparatus.

SUPERVISORY CONTROL AND DATA ACQUISITION (SCADA): A system of remote control and telemetry used to monitor and control the operation of devices and the collection of device status.

SUSTAINED OUTAGE: The de-energized condition of a transmission line resulting from a fault or disturbance following an unsuccessful reclosing procedure.

SWITCHING: The operation of any electrical switchgear.

SWITCHING STATION: An arrangement of feeders, breakers and switchgear designed to maintain continuity or isolate between substations and strategically located in high volume traffic areas where it may not be practical or necessary to have power transformers.

SWITCHING STATION (NEW ENGLAND DIVISION): A location midway between substations, which provides the function of paralleling stations and switching capabilities to bypass dead sections with adjacent substation power.

SYNCHRONISM: The condition when connected AC systems, machines, or a combination of the two operate at the same frequency and when the angle displacement between voltages in them are constant, or vary about a steady or stable position.

SYSTEM: A combination of generation, transmission, and distribution components.



TAG: Whether a paper-based hard copy or a computer-based electronic copy, a tag is attached to circuit apparatus or electrical equipment to designate its unavailability for operation. Provides personnel as well as system safety.

TELEMETERING: The process by which measurable electrical quantities from substations and converter stations are instantaneously transmitted to the control center, and by which operating commands from the control center are transmitted to the substations and converter stations.

TEMPORARY CLEARANCE RELEASE: A temporary release of an issued clearance that officially allows the limits of the clearance to be energized for a short period of time to facilitate activities such as testing or routing of trains.

TENSION LENGTH: One wire length between terminations, from balance weight to balance weight with midpoint anchor or from balance weight to fixed termination in the overhead catenary system.

THERMAL RATING: The maximum amount of electrical current that a transmission line or electrical facility can conduct over a specified time period before it sustains permanent damage by overheating.

THIRD RAIL: An electrified rail located alongside and above the inner/near running rail from which a sliding contact shoe attached to the truck of electric equipment collects direct current.

THIRD RAIL GAP: A break or separation in the third rail, which begins and ends with an end approach.

THIRD RAIL POWER PERMIT: A written document that outlines the procedure followed by the Electric Traction Department when it is necessary to remove power from DC circuits or apparatus in third rail electrified territory.

THIRD RAIL POWER PERMIT NUMBER: A specific, identifying number assigned to a third rail power permit.

THIRD RAIL SHOE (CONTACT SHOE): A device located on the side of electric equipment that collects electric power from the third rail by means of a sliding contact.

THIRD RAIL WARNING DEVICE: A device attached between the third rail and inner/near running rail, which indicates an energized or de-energized circuits or apparatus.

THREE-PART COMMUNICATION: A form of communication where the sender states a message to the receiver, the receiver acknowledges the communication by repeating information back to the sender, and the sender confirms the message is correctly understood by the receiver by stating "that's correct".

TIE SWITCH: A mechanical switching device, either motor or manually operated, that is closed to connect two buses or segments of the catenary system, the third rail system, the transmission system, or signal power lines together.

TRACK HEATER STATION: Located at various locations along the right of way. Track Heater Stations are used to melt snow and ice from rail switches to allow smooth switch operation during inclement weather conditions.



TRACK OCCUPANCY LIGHT: Used to track train movement. During a signal power failure, C&S track circuits will fail showing TOL's in the affected area. A Train Dispatcher's ability to display signals and visually monitor train movement over those sections are absent. The CTC display will indicate in red those sections of the railroad effected.

TRAIN DISPATCHER (TD): The employee responsible for the movement of trains within an assigned territory.

TRANSFORMER (XFMR): Apparatus, which serves to increase or decrease AC voltage.

TRANSMISSION LINE: A system of structures, wires or cables, insulators and associated hardware that carry electric energy from one point to another in an electric power system. Lines are operated at relatively high voltages and are capable of transmitting large quantities of electricity over long distances.

TRANSMISSION SYSTEM: An interconnected group of lines and associated equipment for the movement or transfer of electric energy between points of supply and points at which it is transformed for distribution or delivered to other electric systems.

TRANSFER SWITCH: (i.e.: "S1") When opened (OOS), transfers relay protection for the associated low rupture bus from the master breaker being taken out of service, to another master breaker. This will also disable the auto-close feature of the master breaker being taken out of service.

TROLLEY BREAKER: A component of the traction power distribution system used to supply electrical power to the overhead catenary system for the propulsion of electric trains.

UNPLANNED OUTAGE: Any interruption in the generation, transmission, distribution or signal power system which is not scheduled.

VEGETATION: All plant, material, growing or not, living or dead.

VOLTAGE: Electrical potential or potential difference expressed in volts.

VOLTAGE SENSING DEVICE: A device used by qualified employees to test whether circuits are energized or de-energized.

WATT: A very small unit of power.

a. **MEGAWATT:** One million watts.

WAYSIDE POWER CUBICLE (NEW ENGLAND DIVISION): Located along the right away adjacent to an interlocking. They contain equipment such as a RTU, battery changer and 132 DC battery bank. These components are essential in the operation of sectionalizing switches that are located within the interlocking. They are also used for interlocking lighting thru a transfer switch. The transfer switch gives you the capability to feed off track #1 or #2.



WAYSIDE SIGNAL: A wayside signal is basically any signal - electrical, mechanical, or otherwise - in a fixed location along or above the track to convey information to the train engineer.

WORK PERMIT: A documented record between the Power Director and Class "A" employee when required to repair or test devices when an electrical clearance is not required. No temporary protective grounds are applied and may include operating restrictions or instructions.

WORK PERMIT NUMBER: A specific, identifying number assigned to a work permit.

**APPENDIX B. ABBREVIATIONS AND ACRONYMS**

The Load Dispatcher may be required to record information during their shift. Documents may include but not limited to; Logbook, Permits, Out of Service Equipment, Shift Turnover and Emails etc. The use of approved abbreviations or acronyms may be necessary due to time limitations or space restrictions on forms to enter the necessary information.

An abbreviation is a shortened or contracted form of a word or phrase, used to represent the whole. Some examples of abbreviations would be LD for Load Dispatcher, Hz for Hertz and Adv for Advised.

An acronym is a form of an abbreviation. It is a word formed from the initial parts of a name and can be letters or syllables. Some examples of acronyms would be SCADA for Supervisory Control and Data Acquisition and SEPTA for South Eastern Pennsylvania Transit Authority.

This guideline presents typical abbreviations & acronyms that may be used to make the logging process easier.

ABS	AIR BREAK SWITCH	CP	CAT POLE/ CONTROL POINT
AC	ALTERNATING CURRENT	CS	CUT SECTION
ACB	AIR CIRCUIT BREAKER	CT	CURRENT TRANSFORMER
ADE	ASSISTANT DIVISION ENGINEER	CTC	CENTRALIZED TRAFFIC CONTROL
ADV	ADVISED	DC	DIRECT CURRENT
ASUSD	AUTOMATIC START UP SHUT DOWN	DEPT	DEPARTMENT
ATDA	AMERICAN TRAIN DISPATCHER ASSOCIATION	DPO	DROP PANTOGRAPH ORDER
BB	BUS BREAKER	DRI	DEAD RAIL INDICATOR
B&B DEPT	BRIDGES & BUILDINGS DEPARTMENT	DS	DISCONNECT SWITCH/ DEAD SECTION
BG&E	BALTIMORE GAS & ELECTRIC	EBHS	EAST BOUND HOME SIGNAL
BPA	BROKEN PANTOGRAPH ALARM	EEPS	ENHANCED EMPLOYEE PROTECTION SYSTEM
BT	BUS TIE (BREAKER)	ELDISC	ELECTRICAL DISCONNECT
BTA	BELL TEMPERATURE ALARM	ET	ELECTRIC TRACTION
CB	CIRCUIT BREAKER	E-TECH	ELECTRONIC TECHNICIAN
C&S DEPT	COMMUNICATIONS & SIGNALS DEPARTMENT	FTO	FAIL TO OPERATE
C&T	CLOSE & TRIP	GF	GANG FOREMAN
CETC	CENTRAL ELECTRIFICATION & TRAFFIC CONTROL	GIS	GAS INSULATED SWITCHGEAR
CIH	CENTRALIZED INSTRUMENT HOUSE	GND	GROUND
✓ or CK	CHECK	HEP	HEAD END POWER
CNOC	CONSOLIDATED NATIONAL OPERATIONS CENTER	INT	INTERLOCKING
COMM	COMMUNICATION	IOL	INSULATED OVERLAP
CON-ED	CONSOLIDATED EDITION	I/S	IN SERVICE



POWER DIRECTOR OPERATING GUIDELINES

Appendix B.

25-FOI-00546

00000004203

"UNCLASSIFIED"

8/21/2025

Abbreviations and Acronyms

JCT	JUNCTION	OC	OVERCURRENT
JP	JERICO PARK	OCB	OIL CIRCUIT BREAKER
KV	KILOVOLT	OCS	OVERHEAD CATENARY SYSTEM
KVA	KILOVOLT- AMPERE	OOS	OUT OF SERVICE
LA	LIGHTNING ARRESTER	PB	PHASE BREAK
LAM	LAMOKIN	PCY	PENN COACH YARD
LD	LOAD DISPATCHER	PD	POWER DIRECTOR
LIRR	LONG ISLAND RAILROAD	PECO	PHILADELPHIA ELECTRIC COMPANY
MAD-N	MID-ATLANTIC DIVISION NORTH	PLC	PROGRAMMABLE LOGIC CONTROLLER
MAD-S	MID-ATLANTIC DIVISION SOUTH	PPL	PENNSYLVANIA POWER & LIGHTING
MARC	MARYLAND AREA RAIL COMMUTER	PT	POTENTIAL TRANSFORMER
MBTA	MASSACHUSETTS BAY TRANSPORTATION AUTHORITY	RFC	ROTARY FREQUENCY CONVERTER
MCB	MAIN CIRCUIT BREAKER	RIO	REVERSE INSULATED OVERLAP
MET	METUCHEN	RSFC	RICHMOND STATIC FREQUENCY CONVERTER
MOAB	MOTOR OPERATED AIR BREAK	RR	RAILROAD
MOD	MOTOR OPERATED DISCONNECT	RTS	RETURN TO SERVICE
MP	MILE POST	RTU	REMOTE TERMINAL UNIT
MTO	MANAGER TRAIN OPERATIONS	SBHS	SOUTH BOUND HOME SIGNAL
MU	MULTIPLE UNITS	SCADA	SUPERVISORY CONTROL & DATA ACQUISITION
MVA	MEGA VOLT AMP	SCR	SILICON CONTROLLED RECTIFIER
MW	MEGAWATT	SECT	SECTION
N/A	NON-APPLICABLE	SEPTA	SOUTHEASTERN PENNSYLVANIA TRANSPORTATION AUTHORITY
NBHS	NORTH BOUND HOME SIGNAL	SFC	STATIC FREQUENCY CONVERTER
NCF	NO CAUSE FOUND	SF6	SULFUR HEXAFLUORIDE
NED-E	NEW ENGLAND DIVISION EAST	SH	SAFE HARBOR
NED-W	NEW ENGLAND DIVISION WEST	SHSY	SOUTH HAMPTON STREET YARD
NFW	NOTHING FOUND WRONG	S/I	SIGNAL INTERRUPTION
NGR	NEUTRAL GROUND RESISTOR	SIG LOC	SIGNAL LOCATION
NJT	NEW JERSEY TRANSIT	SL	SIGNAL LOCATION_NEW YORK DIV.
# or NO.	NUMBER	SOI	STANDARD OPERATING INSTRUCTION
NPO	NO POWER OUTAGE	SR ENG	SENIOR ENGINEER
NTIC	NO TRAIN IN CIRCUIT	SSYD	SUNNYSIDE YARD
NYD-W	NEW YORK DIVISION-WEST	SUB	SUBSTATION
NYD-E	NEW YORK DIVISION-EAST	SUPV	SUPERVISOR
NYPD	NEW YORK POWER DIRECTOR	SUY	STEP-UP YARD



POWER DIRECTOR OPERATING GUIDELINES

Appendix B.

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8/21/2025

Abbreviations and Acronyms

TD	TRAIN DISPATCHER	WBHS	WEST BOUND HOME SIGNAL
TEMP	TEMPORARY	WTC	WASHINGTON TRAIN CONTROLLER
TOL	TRACK OCCUPANCY LIGHT	WW	WATER WHEEL
TSO	TRANSMISSION SYSTEM OPERATOR	XO	CROSSOVER
VCB	VACUUM CIRCUIT BREAKER	XFMR	TRANSFORMER



Power Director Seniority Roster
Wilmington Office
Employees of the National Railroad Passenger Corporation
Represented by the American Train Dispatcher's Association
January 2022
Page 1 of 2

Name:	Rank:	Seniority Date:
Bob Megowen	1	12.30.88
Barry Cross Jr.	2	05.12.97
Don Moore {OP}	3	07.24.00
Tyrone Gordon (OP)	4	04.30.08
Rob Kniple {OP}	5	10.09.08
Pat McArdle	6	04.03.09
Maurice Archdeacon	7	04.03.09
Gil Fox	8	05.08.10
Rob Caruso	9	06.29.11
Alex Harris (OP)	10	07.17.11
Ayrica Walker	11	05.05.12
Brian Donmoyer	12	08.15.12
Izeakiel Strange	13	08.15.12
Dale Wesley {OP}	14	08.15.12
Chris Polk	15	12.22.15
Ron Cooper	16	12.22.15
Cody McClintock	17	12.15.16
Eric Serino	18	05.05.17
Andrew May	19	11.10.17

(OP) Official Position

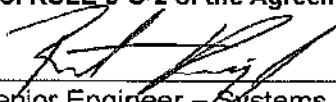


**Power Director Seniority Roster
Wilmington Office
Employees of the National Railroad Passenger Corporation
Represented by the American Train Dispatcher's Association
January 2022
Page 2 of 2**

Name:	Rank :	Seniority Date:
Justin Nacke	20	11.10.17
Mike DiCampello	21	04.24.18
Robert Curry	22	08.24.18
Antonio Fox	23	08.24.18
Marc Rocque (OP)	24	09.13.19
Rashawn Stephen	25	03.13.20
Jonathan Drew	26	03.13.20
Barry Cross III	27	07.02.20
Brian McCarthy	28	09.15.20

**Subject to Protest and Correction for a Period of (60) Sixty Days after the Date Posted
in Accordance with the Provisions of RULE 3-C-2 of the Agreement.**

1/21/22
Date Posted



Senior Engineer – Systems Operations
Electric Traction

CC: Barry Cross Jr.- General Chairman ATDA
Anthony Sarno- Vice General Chairman ATDA

(OP) Official Position

SUBJECT	CLASSIFICATION	DATE APPROVED	P/I NUMBER
National System Attendance	Labor Relations	June 29, 2021	6.2.0

1.0 POLICY

High standards of attendance are essential to the success of Amtrak. Good teamwork requires each of us to support all other members of our teams. Teamwork starts with being consistently present and on time for work. Our customers and co-workers depend on this.

Substandard attendance has an adverse effect on the quality of service given to the customers who pay our wages and salaries. Substandard attendance by employees adversely affects productivity, increases costs and inconveniences coworkers who must fill in for absences or tardiness.

The national attendance policy defines minimum standards of attendance. It addresses the performance of employees who do not meet minimum standards through counseling and, as a last resort, discipline.

2.0 RESPONSIBILITY

The Vice President Labor Relations is responsible for the administration and interpretation of this policy. While exceptions are discouraged, in the event a manager believes an employee's exception request warrants consideration, a request should be forwarded to LaborRelations@amtrak.com for possible consideration by the Vice President Labor Relations.

3.0 PURPOSE

The purpose of this policy is to specify what is expected with respect to attendance thereby contributing to Amtrak's productivity and to counsel/discipline employees who have excessive absenteeism. To eliminate inconsistencies, this policy supersedes all other Amtrak business unit and service center attendance policies nationwide. It is not intended, however, to conflict with or supersede any present or future labor agreement, applicable law or regulation. If such a conflict should occur, the labor agreement, applicable law or regulation will take precedence over this policy.

4.0 SCOPE

This policy applies to all Amtrak employees covered by collective bargaining agreements. Attendance standards for management employees are governed by other corporate policies.

5.0 PROGRESSIVE COUNSELING AND DISCIPLINE

The objective of this policy is to promote operational efficiency and customer satisfaction by minimizing absence, early departures and tardiness for all employees. **Occurrences of absences, early departures or tardiness are the basis upon which performance is measured for purposes of counseling and discipline.** The differing circumstances in on-train versus off-train work require some variance in the definition of an occurrence.

5.1 **Definition of Occurrence For On-Train Employees.** For on-train employees, including members of Amtrak Service Workers Council, Sheet Metal Air Rail Transportation – Transportation Division (Conductors and Steward) and Brotherhood of Locomotive Engineers (Engineers), an occurrence is defined as:

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- An unauthorized single absence from work, an assignment or part of an assignment on one or more consecutive days for the same reason,
- Being unavailable for work on a calendar day (including a missed call, mark-off, failure to mark-up, etc.)¹ or
- Arriving late for sign-up prior to train departure or leaving an assignment before it is completed.

5.2 Definition of Occurrence For Off-Train Employees. For off-train employees, including members of all other labor organizations, an occurrence is defined as an unauthorized:

- Single absence from work or an assignment on one or more consecutive days for the same reason,
- Late arrival, early departure, late return from lunch/break or midday absence or
- Absence from scheduled overtime.

5.3 Exclusions. The following situations are excluded under this policy and do not count as an occurrence of absence for potential consideration regarding counseling or discipline: scheduled vacations, scheduled holidays, where applicable, certain approved absences (specifically for jury duty, military leave, bereavement leave and under the CARE Policy), E-time in the Reservations Sales Call Centers, pre-approved exchange of assignments, pre-approved TCU-agreement “trade days,” pre-approved absences authorized by the employee’s department head to ensure adequate rest or for other Amtrak business purposes, pre-approved union business, compensatory time provided under labor contracts, absences under the PIER program, and absences, early departures or late arrivals covered by and approved under the Americans with Disabilities Act (ADA), the Family and Medical Leave Act (FMLA) and any other applicable state and federal law.

5.4 Notification and Approval. Notification to the manager by the employee of an expected occurrence of absence, early departure or tardiness does not automatically constitute approval unless specifically granted by the appropriate manager or unless it is protected leave under the ADA, FMLA and/or any other applicable state and federal law. Failure to provide adequate notice of an expected absence to the employee’s manager, call center or crew management is subject to additional handling outside the scope of this policy.

5.5 Excessive Absenteeism. **The potential need for counseling or discipline is determined when an employee is excessively absent.** An employee may be regarded as having an instance of excessive absence/early departure/tardiness whenever the employee’s attendance record shows any of the following:

- The third occurrence of absence, early departure and/or tardiness in any 30-day period.
- A fifth occurrence of absence, early departure and/or tardiness in any 90-day period.
- The eleventh day of absence in any twelve-month period regardless of the number of occurrences. Each additional day after the eleventh day may result in additional

¹ Refusing an assignment will be handled pursuant to Amtrak’s [Agreement Employee Discipline Policy, P/I 6.1.](#)

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SUBJECT	CLASSIFICATION	DATE APPROVED	P/I NUMBER
National System Attendance 25-FOI-00546 00000004203	UNCLASSIFIED Labor Relations	8/21/2025 June 29, 2021	6.2.0

action. This will not apply in situations where the employee has experienced an extended absence to recover from a serious medical condition (e.g. surgery) that has been confirmed by the employee's attending physician to Amtrak's Medical Services.

Instances of excessive absenteeism and tardiness will be addressed in accordance with Amtrak's [Agreement Employee Discipline Policy, P/I 6.1](#).

6.0 RELATED POLICIES

- [Agreement Employee Discipline Policy, APIM 6.1](#)

Any employee with questions about this policy should consult with the employee's immediate supervisor or the Labor Relations Department at LaborRelations@amtrak.com.

APPROVED	REVISION NO.	SUPERSEDES	PAGE
William J. Flynn Chief Executive Officer	0	New	3 of 3



To: Agreement Covered Employees
From: Ildefonso Burgos, VP, Infrastructure Maintenance & Construction Services
Cc: Division Engineering
Date: March 21, 2022
Subject: Time Entry Device (TED) Requirements

Recent investigations have determined that the use of TED machines has not been in compliance with past directives.

Please be reminded that the Engineering Department requires hourly employees to stand in front of the TED machines and have their photo captured as they swipe their Amtrak badges at the beginning and end of their work shift. Furthermore, employees may only swipe their own badges; they may not lend or give their badges to anyone else (Policy 3.15.1).

Note that all discrepancies in TEDs including missing swipes, different location swipes other than headquarters, swipes with no person identifiable in the accompanying photo, etc. must be addressed in the Maximo memo field. Missing information regarding discrepancies will be addressed as outlined in the National System Attendance Policy (6.2.0) for all Amtrak Agreement covered employees.

Supervisors must:

- Ensure that TEDs are installed in locations where lighting is adequate to capture photos of employees' faces when they swipe their badges.
- Compare cumulated time scanned next to the time entered by the Foreman.
- Perform a weekly audit on attendance and implement disciplinary action as necessary for non-compliance.

Please be guided accordingly.

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TED Time Entrance Reporting Policy	Date: August 31, 2010 Revision Number: 1

Instruction No. 2

TED Time Entrance Reporting Policy

Prepared by:



Ronald R. Nies
Director – Workforce Management

Approved by:



Steven C. Falkenstein
Deputy Chief Engineer-Maintenance

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Instruction No. 2 TED Time Entrance Reporting Policy	Section 1: Purpose Section 2: TED Kiosk Locations Section 3: Labor and Attendance Reporting Requirements

SECTION 1: PURPOSE

Starting August 2010, Engineering is deploying Electronic Attendance Reporting at all headquarters throughout the NEC. The new enhancement will require employees to swipe their encoded ID cards at the ***beginning*** (clock in) and ***end*** (clock out) of their work shifts using a TED attendance kiosk.

Maximo Time Entry and Approval process will remain in effect and will not be affected by TED Attendance Recording. Discrepancies in attendance recorded hours vs. Maximo time recorded hours will not preclude time approval requirements, but will alert the supervisor of possible errors or other issues.

SECTION 2: TED KIOSK LOCATIONS

Touch screen based TED attendance Kiosks will be located at all M/W headquarters. Production gangs, as well as other select gangs, may be exempt because of variable headquarters.

SECTION 3: LABOR AND ATTENDANCE REPORTING REQUIREMENTS

1. The Amtrak security ID badge is the standard method of access to the TED kiosk.
2. The employee is expected to scan-in at the beginning (clock in) and scan-out (clock out) each workday using a TED attendance kiosk. *Scanning may be done through any device at any location.* Employees will have the option to clock in at one location and clock out at another location dependent upon approval of their manager.
 - a. An employee failing to clock in will show a 0 in the scanned data column.
 - b. An employee who clock in but failed to clock out will show a 0 in the scanned data column.
 - c. An employee clocking in on one day and clocking out on another date (For example: Employee clocks in at 11 pm on December 1 and clocks out 7 am on December 2 will show 1 hour attendance time on December 1 and 7 hours attendance time on December 2.
 - d. Employees cannot clock in or clock out attendance for other employees.
3. Supervisors are required to compare cumulate time scanned next to the time entered by the foreman. Supervisors are required to compare and approve all time
 - a. Multiple scans per day are permitted to accommodate a break in time for approved

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absences

- i. If there are multiple time entries for one day, the cumulative scanned data will appear adjacent to each time entry.
 - b. Discrepancies in attendance hours must be resolved by the supervisor or manager in charge.
4. Administrative rights may be assigned to approved managers to manually enter attendance data for employees who may have lost or forgotten their ID badge, or for employees who may have forgotten to clock in and/or clock out.
5. Misuse or unauthorized tampering with the TED kiosks will result in disciplinary action.